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AN ANALYSIS OF ACADEMIC PERFORMANCE, RETENTION, AND DEGREE  
ATTAINMENT FOR DUAL ENROLLMENT PARTICIPANTS AT A PUBLIC FOUR-  
YEAR INSTITUTION IN TENNESSEE

by

Kristin Jane Mumiukha

A Dissertation

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Education

Major: Higher and Adult Education

The University of Memphis

August 2013

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## **Dedication**

I dedicate this dissertation to my husband, Mumelo, and my son, Emery. Mumelo, you have been there every day giving me words of encouragement and support, even as you have pursued your own goals and dreams. Emery, to watch you learn and grow has been an amazing adventure. I look forward to our future together and for everything God has in store for us!

I am also forever grateful to my parents, Ron and Patty Schaefer, who have been true pillars of strength and support. They taught me the importance of God and family, to always follow my dreams, and to never quit or give up. Words cannot express the thankfulness and gratitude I feel. Thank you!

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both personally and professionally. I truly appreciate your honesty, and for taking the time to guide me through my degree process.

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## **Abstract**

Mumiukha, Kristin J. Ed.D. The University of Memphis. August, 2013. An Analysis of Academic Performance, Retention, and Degree Attainment for Dual Enrollment Participants at a Public Four-Year Institution in Tennessee. Major Professor: Patricia H. Murrell, Ed.D.

When the United States' Secretary of Education, Arne Duncan, was asked how to better prepare students for higher education he said: "We have to increase rigor in high schools to prepare young people for the next stage of life by boosting opportunities so that they gain the support they need to meet those higher standards" (as cited in Oregon Department of Education, 2011, p. 2). One way to boost opportunities for educational growth is through participation in dual enrollment programs. There are many proposed benefits for participation in dual enrollment programs, such as smoother transitions between high school and college, decreased time to graduation, and increased graduation rates; however, there is a lack of quantifiable supporting data for those proposed benefits (Allen, 2010; Andrews, 2004; Karp, Calcagno, Hughes, Jeong, & Bailey, 2008; Kim & Bragg, 2008).

The purpose of this study was to examine students' academic performance, retention and degree attainment at the University of the Mid-South, after their participation in the institution's high school based dual enrollment program. A group of dual enrollment students were compared to other students within their academic cohort who entered the academic institution with similar pre-entry educational attributes. The pre-entry attributes that were used to measure academic ability were: cumulative high school GPA and maximum composite ACT score. There were 6,377 students included in this study who enrolled as first-time, full-time freshmen from fall 2008 through fall 2011

semesters. Only 370 (5.8%) students included in this study had participated in the institution's high school based dual enrollment program.

This study found that students who had participated in the dual enrollment program were more likely to be retained, had higher average GPAs after one academic year, and were more likely to graduate in the four years this study was conducted. However, no significant differences were found after conducting the binary logistic regression analyses on retention and graduation. Therefore, it was strongly recommended to conduct more longitudinal studies at various institutions and levels in order to further enhance the research on dual enrollment participants' subsequent academic performance in higher education.

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## **Chapter 1**

### **Introduction**

“College matters. It matters to individuals and it matters to our country. Going to college, earning a degree, even taking college-level classes and earning certifications can make a large difference in family and societal outcomes” (Lerner & Brand, 2006, p. 3). The Center for Education in the Workforce predicts that by 2018 approximately 63% of new American jobs created will require some form of higher education (Carnevale, Smith, & Strohl, 2010). “Demand for workers with college educations will outpace supply to the tune of 300,000 per year. By 2018, the postsecondary system will have produced 3 million fewer college graduates than demanded by the labor market” (Carnevale et al., 2010, p. 16).

According to a report by Complete College America (2011), forty-one percent of students who enter college do not meet the entrance requirements and must take remedial courses, which do not count as credit hours toward graduation. Remedial education is defined as “education intended to remedy a situation; that is, to teach students what they should have already learned” (Education.com, Inc., 2006, para. 1). Often when students enter post-secondary coursework underprepared, they quickly become discouraged because the non-credit courses delay the time to graduation often resulting in higher dropout rates (Complete College America, 2011).

The National Center for Education Statistics (2012b) reported that the national graduation rate for first-time, full-time freshmen attending four-year institutions in the fall 2004 was approximately 58%. These measures are based on students who earned degrees within six years of initial enrollment (National Center for Education (NCES),

2012b). The 32% of students who do not finish college will earn less income over their lifetime than those that do finish (NCES, 2012a). According to the NCES (2012a), in 2010 young adults with a bachelor's degree in general earned 50% more annually than those with only a high school diploma, and 22% more than young adults with an associate's degree. Students with their master's degree earned 21% more annually than those with their bachelor's degree (NCES, 2012a). The difference in annual earnings impacts the individual as well as the economy.

Dropping out of college not only costs the individual students large debts, but also costs the higher education institutions, the tax payers, and the nation. In a report published by the American Institutes for Research, the cost to the nation for one year and one cohort of students not completing a college degree was estimated to be approximately \$3.8 billion in lost income, \$566 million in lost federal income taxes, and \$164 million in lost state income taxes (Schneider & Yin, 2011). The loss in potential income and taxes is only magnified by the cost of attrition for the higher education institutions. Approximately \$3.47 billion is spent annually for students who enter their freshman year and do not return their sophomore year (CollegeMeasures.org, 2011). Schneider and Yin (2011) stated that "because the losses for students accumulate year after year, these estimates understate the overall costs of low college graduate rates" (p. iv). In order to decrease these costs, educators and policy makers have been tasked with finding a solution that will better prepare students for academic success in higher education.

Policy makers have determined that one of the potential solutions to better prepare students for success in higher education is to increase access to educational opportunities

for high school students. Accelerated learning programs are one type of educational opportunity available to high school students. Arne Duncan, the United States Secretary of Education, is a proponent for these programs. When Secretary Duncan was asked how to better prepare students for higher education he said: “We have to increase rigor in high schools to prepare young people for the next stage of life by boosting opportunities so that they gain the support they need to meet those higher standards” (as cited in Oregon Department of Education, 2011, p. 2).

The Oregon Department of Education (2011) found that accelerated learning programs:

- Prepare students for college through rigorous high school coursework;
- Engage juniors and seniors by offering college credit-bearing courses;
- Provide students with the necessary skills and experiences for successful transition to college;
- Reduce college expenditures by decreasing the amount of time to graduation; and
- Increase communication, collaboration, and curricular alignment between secondary and post-secondary education systems.

Dual-credit, one type of accelerated learning program, has experienced tremendous growth across the nation. According to the 2005 report on dual credit opportunities by the National Center for Education Statistics, more than 87% of America’s public high schools offered students dual-credit opportunities. These programs have experienced growth over the past forty years because they are viewed as a way to transition high school students to postsecondary education and the work force

(Oregon Department of Education, 2011). There are multiple types of dual credit programs in the United States:

- Advanced Placement (AP): Students enroll in specific subject courses to earn college credit. The student must take an exit exam and score a '3' or higher on a scale of 1-5 in order to earn the credit.
- Dual/concurrent enrollment: Students participate in college-level courses that are offered at the high school or at the higher education institution. The student may earn high school credit, postsecondary credit, or both.
- Early/Middle college high school: Students enroll and have the opportunity to earn "substantial amounts of postsecondary credit while still in high school" (Griffith, 2009, p. 1).
- International Baccalaureate (IB): Highly motivated students participate in a curriculum aligned with international standards that is challenging and takes two years to complete. Students are able to earn postsecondary credit based on an end-of-course exam.
- Technical preparation: Students enroll in technical courses during their junior and senior year of high school that will prepare them for work in a specific trade or industry. (Griffith, 2009)

These programs share common elements that are important to the preparation, graduation, and matriculation of high school students to postsecondary education (Bradley, 2007).

Dual/concurrent enrollment has become a very popular dual-credit opportunity available to high school students. Griffin (2009) found that participation in dual

enrollment programs allows students the opportunity to earn college credit while still enrolled in high school, provide accelerated learning opportunities for gifted students, as well as aiding in at-risk student retention. Hoffman, Vargas, and Santos (2009) found that exposure to college can increase academic rigor at the high school level, as well as help motivate students to enroll in postsecondary education institutions after high school graduation.

## **Tennessee**

In order for Tennessee to keep up with the growing demand for an educated workforce, more students who enter higher education must graduate. Complete College America (2011), a national nonprofit organization, estimates that 31% of adults in Tennessee, ages 25 to 34, have earned an associate's degree or higher. This is lower than the national average of 38% of adults. The average graduation rate for first-time, full-time freshman at public higher education institutions in Tennessee is 46.8%, which is also lower than the national average of 58% (Complete College America, 2011). Complete College America (2011) predicts that by 2020 approximately 56% of jobs in Tennessee will require some level of post-secondary education. Thus, the skills gap between the current percent of educated workers and those that will be needed is 25%, and this gap will need to be closed in order to build a stronger economy in Tennessee (Complete College America, 2011).

Tennessee policy makers have recognized the growing urgency to increase the percent of citizens with a postsecondary degree. The Complete College Tennessee Act was signed into law on January 26, 2010 (Complete College Tennessee, 2012). The Complete College Tennessee Act (2012) is "a comprehensive reform agenda that seeks to

transform public higher education through changes in academic, fiscal and administrative policies at the state and institutional level” (para. 1). The purpose, and potential benefits, of this law are to:

- Champion the need for increased college completion rates in Tennessee, and improved postsecondary education;
- Create a climate in which the recently passed reforms may be implemented;
- Have a better educated and more prepared workforce; and
- Better position Tennesseans to compete for “knowledge jobs,” which will comprise the majority of new jobs over the next decade (Complete College Tennessee, 2012).

The ultimate goal of the Complete College Tennessee Act (2012) is to establish a direct link between the state’s economical development and its education system. In order to achieve this goal, a new funding formula model was developed. The previous funding model allotted approximately 60% of funding based on enrollment. The new funding formula rewards institutions based on the outcomes specified for each individual institution. The outcomes are grouped into several categories: student progression, degree production, efficiency, and other important institutional functions (Complete College Tennessee, 2012). The outcomes are weighted, based on the institutional mission which is a reflection of the institution’s Basic Carnegie classification. Unlike a performance funding model, the outcomes based model does not have overall annual targets, so the institutions cannot be penalized for not reaching a predetermined goal.

Another development of the Complete College Tennessee Act (2012) is the elimination of remedial and developmental education in four-year public colleges and

universities. As of July 1, 2012, remedial and developmental education will only be provided by Tennessee's 13 community colleges. The four-year institutions are to partner with community colleges in order to deliver these academic support courses. This will impact students as well as higher education institutions; however, it is unclear at this time to what extent.

**Dual enrollment.** In Tennessee, colleges have been collaborating with area high schools to offer dual enrollment coursework for many years. Over the years, dual enrollment programs have experienced changes in and out of the classroom. The dual enrollment program experienced rapid growth after the implementation of the Dual Enrollment Grant. This grant is funded through the Tennessee Education Lottery Scholarship (TELS) program, which was established in 2005 (Lottery Scholarships Act, 2008). The grant provides funding for academically eligible high school juniors and seniors enrolled in lower-division, college-level courses (College Pays, 2011a). With the recent push by state policy makers for a better educated workforce and more focus on reforming higher education, the dual enrollment program is receiving more attention now than ever.

### **Statement of the Problem**

According to Complete College America (2011), 41% of students who enter higher education are unprepared for the rigorous coursework and must take remedial courses. As a result of this lack of academic preparation, only 58% of students who enter higher education graduate within six years of initial enrollment (NCES, 2012). This problem is further complicated by the cost of students not completing college. As previously mentioned, the American Institutes for Research estimated the cost to the

nation for one year and one cohort of students is estimated to be over \$4 billion in lost income, federal income taxes, and lost state taxes (Schneider & Yin, 2011). In order to better prepare students for academic success in college, and decrease the economic impact of students not graduating from college, policy makers have been expanding dual enrollment programs nationwide.

There are many proposed benefits for participation in dual enrollment programs, such as smoother transitions between high school and college, decreased time to graduation, and increased graduation rates; however, there is a lack of quantifiable supporting data for those proposed benefits (Allen, 2010; Andrews, 2004; Karp et al., 2008; Kim & Bragg, 2008). In order for educators and policy makers to continue to advocate and allocate funds for dual enrollment programs across the country, research needs to be conducted to determine if the programs are reaching their objectives and creating smoother transitions and success for the participants in higher education.

### **Purpose of the Study**

The purpose of this study is to examine students' academic performance, retention and degree attainment at the "University of the Mid-South<sup>1</sup>," after participating in a high school based dual enrollment program. A group of dual enrollment students were compared to other students within their academic cohort who enrolled at the University of the Mid-South from the fall 2008 through the spring 2012 semester with similar pre-entry educational characteristics. By comparing the dual enrollment participants to the other first-time, full-time freshmen students who did not participate in the dual enrollment program, the researcher was able to determine if the dual enrollment program

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<sup>1</sup> In the interest of protecting the anonymity of this participating institution, the pseudonym University of the "Mid-South" or "UMS" will be used.

had any influence on the students' academic performance and persistence, as well as ascertain whether the current goals and objectives of the dual enrollment program in Tennessee are being met.

### **Research Questions**

The researcher for this study acknowledges the importance of conducting research in these fields and intends to add to the growing body of dual enrollment literature with quantifiable supporting data. In order to address this growing demand, the following research questions were addressed:

1. Does student participation in dual enrollment courses have any influence on first year retention for first-time, full time freshmen after controlling for students' pre-entry academic characteristics?
2. Does student participation in dual enrollment courses have any influence on students' cumulative GPA after one academic year for first-time, full time freshmen after controlling for students' pre-entry academic characteristics?
3. Does student participation in dual enrollment courses have any influence on time to graduation for first-time, full time freshman after controlling for students' pre-entry academic characteristics?

### **Definition of Terms**

Dual enrollment is defined differently in different states and districts across the United States. For this study, the following definitions have been adopted from the Tennessee Student Assistance Corporation:

- *Dual Credit*: A postsecondary or high school course that is aligned to a post-secondary course that is taught at the high school by high school faculty for high

school credit. Students are able to receive postsecondary credit by successfully completing the course, plus passing the assessment developed and/or recognized by the granting post-secondary institution. The institution will grant the credit upon enrollment of the student.

- *Dual Enrollment*: a postsecondary course, taught either at the post-secondary institution or at the high school by the postsecondary faculty (may be credentialed adjunct faculty), which upon successful completion of the course, allows students to earn postsecondary and secondary credit concurrently.
- *Dual Enrollment Grant*: A grant for study at an eligible postsecondary institution that is funded from net proceeds of the state lottery and awarded to students who are attending an eligible high school and who are also enrolled in college courses at eligible postsecondary institutions for which they will receive college credit.
- *Tennessee Education Lottery Scholarship Program*: Provides financial awards to offset costs associated with pursuing postsecondary education.
- *Tennessee HOPE Scholarship*: scholarship for study in pursuit of an associate or baccalaureate degree at an eligible postsecondary institution that is funded from net proceeds of the state lottery.
- *Weighted Grade Point Average (GPA)*: grade point average on a 4.0 scale calculated with additional points awarded for advanced placement, honors or other similar courses. (T.C.A. § 49-4-902)

### **Delimitation**

There are delimitations to this study. First, only the dual enrollment program participants at the University of the Mid-South will be evaluated and compared to the

other students in their cohort with similar pre-entry academic characteristics; thus, the results for participation in the dual enrollment program and postsecondary achievement may only be applicable to students in this study. Another significant delimitation to this study is that the lottery scholarship funding for the dual enrollment program is relatively young and lacks historical perspective. The Dual Enrollment Grant in Tennessee was first implemented in the fall 2005, and even though student participation in dual enrollment has steadily increased annually, those first years saw low enrollment numbers. Consequently, there is a relatively small population of dual enrollment participants to be studied.

### **Significance**

Despite the growth of dual enrollment programs nationwide, there is still debate between policy makers and administrators as to the success of the program. The researcher intends to begin bridging the gap between the proposed benefits of participation in dual enrollment and the lack of quantifiable data. This study aims to provide information to assist policy makers, high school and college administrators, and students and families regarding college performance after participation in dual enrollment programs. This study will contribute to the growing body of literature by providing a quantitative statistical analysis of students' performance in higher education after they participated in dual enrollment courses in high school. This research is especially important at a time when federal and state governments are highlighting the current gaps in educational attainment and beginning to tie institutional outcomes to funding.

## Summary

In this chapter, the researcher introduced dual enrollment as a specific type of accelerated learning opportunity available for high school students. Dual enrollment programs have been expanding nationwide, and researchers have found that participation in the dual enrollment programs has increased matriculation of high school students to college, prepared students for the academic rigors of college courses, and aided in at-risk student retention (Bradley, 2007; Griffin, 2009; Hoffman, Vargas, & Santos, 2009). Despite the research findings, there are still critics of dual enrollment programs who doubt the programs are actually preparing students for higher education or meeting the stated goals and objectives.

In Tennessee, universities are collaborating with high schools to offer more dual enrollment opportunities for high school students. This increase is in part attributed to the increased demands placed on higher education institutions by the Complete College Tennessee Act (2012), and the funding available for students to participate in the dual enrollment programs through the Tennessee Lottery Dual Enrollment Grant. As a result, more and more high school students are entering post-secondary education with college credits. In order to determine if the current dual enrollment program in Tennessee is meeting the stated goals and objectives, the researcher conducted a quantitative analysis to determine the programs' effectiveness by examining students' academic performance, retention, and degree attainment in higher education.

In chapter 2, the researcher will provide an in-depth literature review. First, Alexander Astin and Vincent Tinto's theoretical models will be discussed as they were used to guide the researcher. Then, a historical account of the evolution of dual

enrollment programs will be provided. The researcher will discuss program development nationally, as well as in Tennessee. Finally, the researcher will address current research in the field of dual enrollment. In chapter 3, the methods and statistical procedures used to analyze the proposed research questions will be discussed. In chapter 4, the descriptive statistics, Pearson Chi-square analyses and the logistic regression results for the research questions will be expressed. In chapter 5, the results from the statistical analyses will be interpreted and implications for future studies will be discussed.

## **Chapter 2**

### **Literature Review**

Dual enrollment programs were developed as a collaborative effort to join high schools and colleges. The program allows high school students, typically juniors and seniors, the opportunity to enroll in college level courses and simultaneously earn credit toward their high school diploma and college credit. This chapter will provide an in-depth review of the literature to aid in understanding dual enrollment programs. First, the theoretical models used in developing this study will be discussed. Alexander Astin's (1984, 1999) Student Involvement Theory examines students' success as a function of their involvement in the learning environment. Vincent Tinto's (1982) theory on student attrition was "designed to highlight in the clearest explanatory terms specific types of relationships between individuals and institutions that may account for particular types of dropout behavior" (p. 689). Astin and Tinto's theories were utilized as theoretical models to guide the researcher because of the theorists' focus on student involvement and integration into higher education as a function of student success in higher education.

Dual enrollment will then be addressed in depth. First, the history of dual enrollment will be examined, along with the evolution of dual enrollment policies. Then, Tennessee's dual enrollment policies will be examined since this study will examine the outcomes of dual enrollment for one institution, the University of the Mid-South. The researcher will discuss the Tennessee Education Lottery Scholarship program, which was the catalyst in funding the dual enrollment program in Tennessee, as well as current issues facing the future of the Tennessee Dual Enrollment Grant. Finally, a look at the reported dual enrollment outcomes for different states and institutions will provide an

indication of the growth of dual enrollment nationwide. This will be discussed in order to develop a holistic understanding of the program.

### **Theoretical Models**

**Alexander Astin.** Alexander Astin's (1984, 1985, 1999) Student Involvement Theory poses that in order to achieve the intended effects in a curriculum, students must expend sufficient effort and energy to bring forth the desired learning and development. Astin (1999) defines student involvement as "the amount of physical and psychological energy that the student devotes to the academic experience" (p. 518). He further explains that student involvement is behavioral in nature, and explains the importance of understanding what individuals do, or how they behave, in regards to involvement. It is not enough for a student to simply go through the motions of receiving an education; instead they must actively invest their time and energy in the success of their own future.

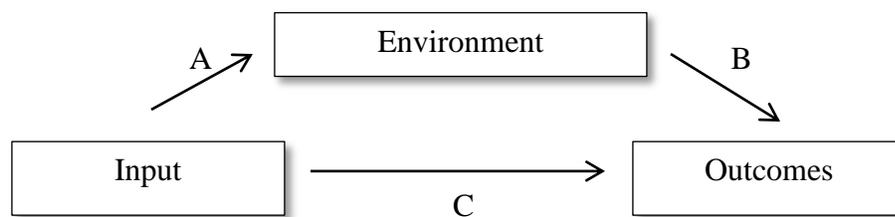
Astin (1984, 1985, & 1999) identifies five virtues of the Student Involvement Theory. First, the theory is simple and straight forward. Second, it provides a basis for understanding the literature and research in the field of higher education. Third, the theory holds principles from many different sources and theories. Fourth, involvement is applicable to students and faculty. Finally, the theory can be utilized as a tool to guide research and also to develop more effective student learning environments. These virtues, as described by Astin, are the reason that Student Involvement Theory was utilized in this study. The straight forward nature of the theory guided the development of the research questions, and the theory's utilization as a tool will serve to further develop programs in the future that will enhance students' accessibility to dual enrollment programs.

According to Astin (1984, 1999), Student Involvement Theory emphasizes active participation by the students in their learning process, and in order for the students to achieve the intended effects of a curriculum, they must elicit sufficient effort and energy in order to bring about the desired learning and educational development. The researcher believes this is particularly important in the dual enrollment context because students who enroll in dual enrollment courses while still in high school show an interest in their educational future and actively participate in their learning process by taking these academically advanced course options. Dual enrollment courses challenge students to begin thinking and performing as college students while still enrolled in high school and it is the students' choice of whether to participate.

Astin (1984, 1985, & 1999) developed the Student Involvement Theory after working with Vincent Tinto on researching college dropouts in the 1970s. His initial work was aimed at identifying college environmental factors that significantly affected a student's persistence. Some of the environmental factors that were identified to facilitate persistence were: full-time attendance, participation in extracurricular activities, studying hard, living on campus, and interacting with other students and faculty (Astin, 1984, 1985). Astin determined that the key factor in student persistence was involvement. Since the development of the Student Involvement Theory, other researchers have applied it to adult students (Chaves, 2006), student participation in learning communities (Zhao & Kuh, 2004), and student participation in leadership education and training programs (Cress, Astin, Zimmerman-Oster, & Burkhardt, 2001). These researchers have all concluded similarly that student participation is important in determining student success in higher education. The researcher for this study believes that participation in dual

enrollment courses can lay the foundation and provide support for students' future success in higher education.

***Input-Environment-Outcomes model.*** Astin (1993a) explains that the Input-Environment-Outcome (I-E-O) model was developed to be a “conceptual guide” (p. 16) for higher education assessment. The I-E-O model is relatively straight forward; however, it can be utilized in very complex situations because of its powerful nature (Astin, 1993a). The I-E-O model is broken down into three distinct variables: input, environment, and outcomes (Astin, 1993a, 1993b). Input refers to the personal qualities individuals bring with them, which includes their initial level of developed talent (Astin, 1993a, 1993b). Environment refers to the students' physical and intellectual experiences during their higher education program, and outcomes refer to the educational abilities students develop in their educational program (Astin, 1993a, 1993b). Another way to understand the variables in the I-E-O model is to refer to outcomes as dependent variables, and environment and input as independent variables (Astin, 1993a). Figure 1 illustrates the I-E-O model.



*Figure 1.* Input-Environment-Outcomes Model developed by Astin. Adapted from “*Assessment for Excellence*,” by A. W. Astin, 1993, p. 18. Copyright 1993 by American Council on Education and The Oryx Press.

The arrows (A, B, and C) within the I-E-O model depict the relationship between the variables. In higher education, researchers are focused on the relationship of the environment to the outcomes, or the B arrow. However, it is important when researching student outcomes that the researcher considers the input variables. Input variables have both an indirect relationship to outcomes (through Environment) as well as a direct relationship (arrow C) (Astin, 1993a). The focus of this research was to determine if student involvement in dual enrollment courses (input) has any relationship with retention, GPA, and degree attainment (output).

**Vincent Tinto.** Vincent Tinto developed his theory on student departure by utilizing Durkheim's theory of suicide as a descriptive model because "it helps explain how various individuals come to depart from institutions of higher education" (Tinto, 1987, p. 105). According to Durkheim, "suicide is more likely to occur when individuals are insufficiently integrated into the fabric of society" (as cited in Tinto, 1975, p. 91); thus, Tinto proposed that college students were more likely to drop out because of insufficient integration and interaction with others in the social and academic culture within the college. Tinto theorizes that:

Students enter a college or university with a variety of patterns of personal, family, and academic characteristics and skills, including initial dispositions and intentions with respect to college attendance and personal goals. These intentions and commitments are subsequently modified and reformulated on a continuing basis through a longitudinal series of interactions between the individual and the structures and members of the academic and social systems of the institution. (Pascarella & Terenzini, 2005, p. 54)

According to Tinto (1975), the key for student retention and persistence is integration. Integration is defined as “the extent to which the individual shares the normative attitudes and values of peers and faculty in the institution and abides by the formal and informal structural requirements for membership in that community or in subgroups of it” (Pascarella & Terenzini, 2005, p. 54). The researcher believes that the academic preparation and interaction received by students who participate in dual enrollment courses prepares them for future academic interactions in higher education, thus leading to higher retention rates.

Tinto (1982) realized there were some limits to his original theory. Initially, the theory “attempted to ask how institutions themselves are at least partially responsible for the dropout they now seek to remedy” (Tinto, 1982, p. 688). He soon realized that students’ individual characteristics play more of a role in student departure than initially theorized. After recognizing the shortcomings of the initial model, Tinto identified several areas that needed further development to better understand student departure. Some of the areas Tinto (1982) identified included: the role of finances in student disengagement; dropout as transfer between institutions; dropout among different groups of students, such as race and gender; and differentiation between two- and four-year higher education institutions. In 1987, Tinto expanded his theoretical model to include the external commitments students experienced.

Tinto’s (1987) model for longitudinal departure was “intended to speak to the longitudinal process of departure as it occurs within an institution of higher education” (p. 112), and is not a systems model for departure. This model was developed by Tinto to pay attention to students’ voluntary withdrawal from a higher education institution, as

opposed to academic dismissal; and to be longitudinal and interactional in character. A particular emphasis was placed on individuals' academic and social interactions with the institution. The social nature of the model allows for researchers and administrators to focus on multiple interactions within the model, such as the social and intellectual context of the institution, as well as the formal and informal environment.

After several years of furthering his research, Tinto (2006) noted that researchers' approach to student retention had evolved and had also undergone several changes since his initial theory in 1975. First, the understanding of student experiences from different backgrounds has been enhanced, as well as a greater appreciation for the variety of forces that shape student retention in higher education. Second, there is a better understanding that student retention differs for different types of institutions. Third, an appreciation of the limits for the early models of student retention had developed as the literature and complexity about student retention grew. Finally, researchers have determined that involvement matters, especially in the first years of college.

Pascarella and Chapman (1983) and Pascarella and Terenzini (1983) conducted path analyses to test the validity of Tinto's model. Pascarella and Chapman's (1983) study examined college withdrawal in different types of institutions: four-year residential institutions, four-year commuter institutions, and two-year commuter institutions. They found that the results supported the predictive validity of the model; however, differences existed between institutional types. Pascarella and Terenzini's (1983) path analysis yielded results consistent with the model; however, they noted differences for males and females in terms of social integration, as well as "significant compensatory interaction

between social and academic integration and between institutional and goal commitment” (p. 215).

Vincent Tinto and Alexander Astin have been instrumental in the development of theories and conceptual models in the field of student retention and attrition. The researcher utilized these theoretical concepts in developing the foundation for this study, and believes that the dual enrollment program is an input variable. As previously discussed, the input variable in Astin’s I-E-O model has both a direct and indirect impact on students’ outcome in higher education. Furthermore, students’ participation in the dual enrollment programs will act as an early integration technique that will prepare students to be active participants in their higher education endeavors. As both Astin and Tinto have explained through their theoretical models, students’ active participation and integration into the higher education setting are important in decreasing attrition rates, as well as increasing student retention and completion of their selected degree programs.

### **Dual Enrollment**

The National Alliance of Concurrent Enrollment Partnerships (NACEP) is a “professional organization for high schools and colleges that advances seamless education through secondary and post-secondary collaboration” (National Alliance of Concurrent Enrollment Partnerships, 2010, p. i). NACEP was established in 1999 in response to the increase in dual-credit courses being offered across the country, and “fosters student success and achievement by supporting standards of excellence that promote program and professional development, accreditation, research and advocacy” (NACEP, 2010, p. i). NACEP defines dual enrollment as:

Opportunities for high school students to take a college class in order to simultaneously earn both high school and transcribed college credit. Dual enrollment courses can be taught by high school and/or college/university instructors and can occur on the high school campus, the college/university campus, or via distance education. (NACEP, 2010, p. i)

In 2002, NACEP adopted national standards that include measurable criteria in five categories that are “markers of excellence” for dual and concurrent enrollment programs: curriculum, faculty, students, assessment, and program evaluation (NACEP, 2012). NACEP encourages states to identify quality assurance mechanisms that encourage colleges and universities to adopt practices without burdening them with regulatory measures, although NACEP accreditation is not mandatory for dual enrollment programs. As of April 2012, there are 83 concurrent enrollment programs accredited by NACEP which include 49 two-year public colleges, 27 four-year public universities, and 7 four-year private colleges and universities (NACEP, 2012).

**History.** Dual enrollment is not a new concept to the world of education. As early as the 1970s, advanced high school courses have been developed around the country offering students the opportunity to get a head start academically (Mokher & McLendon, 2009; Syracuse University Project Advance, n.d.). Minnesota implemented the first comprehensive dual enrollment program in 1985 (Kotamraju, 2005), and Virginia followed up soon after in 1988 (Catron, 2001). In the early 2000s, a boom in the expansion of dual enrollment programs occurred nationwide. From 1976 to 1990, only 17 states adopted dual enrollment policies; and from 1990 to 2005 an additional 25 states

adopted state policies concerning dual enrollment, marking a 35 % increase over the previous 14 year period (Mokher & McLendon, 2009).

Mokher and McLendon (2009) examined what might have triggered the widespread state adoption of dual enrollment policies by using a multivariate event history analysis with longitudinal data collected for over 30 years, and identified numerous influences on policy adoption. First, they found that states with a large percentage of two-year higher education enrollments were more likely to adopt dual enrollment policies. Then, they found that states with consolidated governing boards and that were primarily under unified Republican control of the legislation were more likely to adopt dual enrollment policies. Finally, they found that states that had previously adopted other innovative educational reforms were more likely to adopt statewide dual enrollment policies. Mokher and McLendon (2009) concluded that “continued efforts on this research agenda will improve our understanding of the various pressures faced by states as they seek to improve the transition from high school to college by uniting secondary and postsecondary education” (p. 272).

***Syracuse University: Project Advance.*** One of the first dual-credit opportunities was initiated in 1972 at Syracuse University, called Project Advance. Project Advance was initiated as a way to “cure senioritis,” which occurs when students relax their senior year of high school rather than preparing for their college career (Syracuse University Project Advance, n.d.). Six K-12 school administrators approached Syracuse University with the idea of developing a college readiness program for their high school seniors. In developing the college readiness program, it was important to the development committee that the program be “self-sufficient and capable of implementation and

expansion without creating a financial burden” (Syracuse University Project Advance, n.d., para. 2). Three factors became apparent early in the design process: 1) individual concurrent enrollment courses would require different formats than typical high school courses, and new relationships would be developed between Syracuse University faculty, high school faculty and students; 2) success would depend on the quality of the concurrent enrollment course being offered; and 3) grading in the concurrent enrollment courses would have the identical criteria as the campus counterparts (Syracuse University Project Advance, n.d.).

In the beginning of the program in the fall of 1972, Syracuse University offered one course at six area high schools, and by the Fall of 2011 had grown to 35 courses offered at more than 2,000 K-12 schools across six states: New York, New Jersey, Maine, Massachusetts, Michigan, and Rhode Island (Syracuse University Project Advance, n.d.). Project Advance is not only concerned with student preparation for post-secondary education, but also the professional development of high school teachers, and has helped more than 750 K-12 educators to become Syracuse University adjunct faculty (Syracuse University Project Advance, n.d.). According to Syracuse University, students who participated in their dual-credit courses reported as follows:

- 91% of Project Advance graduates received recognition for their courses at the college or university they enrolled in after high school;
- 93% of the students reported a GPA of B or above through the four years of college;
- 95% recommended Syracuse University courses that were offered through Project Advance; and

- 92% of the teachers involved in Project Advance found their jobs more challenging (as reported in Andrews, 2001).

The Project Advance model has been used by many other colleges and universities nationwide to establish programs at their own institutions. Some of these programs include: LaGuardia Community College's Middle College High School in 1974, Florida International University's Partners in Progress program in 1982, and Kingsborough Community College's College Now program in 1984 (Office of Community College Research and Leadership, 2006).

**Dual enrollment policies.** What began as a method to “cure senioritis” has grown into a program that is being offered in 46 states nationwide (Education Commission of the States [ECS], 2008b). The policies governing dual enrollment programs vary from state to state, and it is important to note that there is no established state or national database for dual enrollment programs and policies (Jobs for the Future, 2005). The U.S. Department of Education (2005), as a part of the ongoing work for the Accelerated Student Success project, reviewed all 50 states' policies concerning dual enrollment. Their methodology consisted of accessing all 50 states' websites for dual enrollment-related policies, and then contacting individuals within those states who were responsible and knowledgeable for that state's policies. The states' representatives were then asked to confirm the findings, and if necessary, to provide additional information. The task force found that 40 states had policies concerning dual enrollment programs (U. S. Department of Education, 2005).

Since the initial report in 2005, six additional states have enacted statewide policies concerning dual enrollment and early college readiness (ECS, 2008b). The states

that do not have a statewide policy for dual enrollment are Alaska, New Hampshire, New York, and Rhode Island, along with the District of Columbia (ECS, 2008b). Even though these states, and the District of Columbia, do not have statewide policies, they leave dual enrollment policies up to the discretion of the local districts and postsecondary institutions.

In February 2013, the National Center for Education Statistics (NCES) reported data on the “prevalence and characteristics of dual enrollment programs at postsecondary institutions in the United States” (Marken, Gray, & Lewis, 2013, p. 1). They surveyed postsecondary institutions for the 2010-11 academic year on the number of high school students enrolled in college-level courses (Marken et al., 2013). A few of the selected findings on courses at 2-year and 4-year degree granting postsecondary institutions include: 46% reported institutions had high school students enrolled in college-level courses through a dual enrollment program; 64% of the dual enrollment programs courses were taught on a high school campus; and 87% were instructed by qualified high school instructors (Marken et al., 2013).

Policies concerning dual enrollment vary in many ways. The Community College Research Center identified ten features that vary among dual enrollment programs: state mandates and oversight; target population; admissions requirements; location; student mix; credentialing and approval of the instructors; course contents; method of credit-earning; program structure and intensity; and tuition and funding (Karp, Bailey, Hughes, & Fermin, 2005)

***Funding dual enrollment.*** Funding for dual enrollment and dual credit programs is one of the differences between state policies concerning dual enrollment that is an

emerging issue. According to a report by Education Commission of the States (2008a), of the forty-six states that have dual enrollment policies, six states have no clear funding source for dual enrollment programs. The funding policies for the dual enrollment programs vary from state to state. Five primary sources of funding have been identified:

- Students/parents: Twenty-two states
- Student's school district: Six states
- Participating postsecondary institution: Three states
- The state department of education or another state organization: Three states
- Multiple dual enrollment programs in which different groups are responsible for tuition: Four states (Georgia, Indiana, Louisiana, and Missouri)
- No clear funding system in place: Six states (Education Commission of the States [ECS], 2008a).

It is important to note that in some of the states the language of the policy indicates that the district or higher education institution “may” as opposed to “will” fund tuition. This is important because it still means that the primary responsibility for funding dual enrollment programs lies with the student or parent and not the district or higher education institution.

***Target population and admissions requirements.*** Typically, state policies allow the most academically gifted students to participate in the dual enrollment program; however, some states are beginning to reach out to include at-risk and minority students (Krueger, 2006). In a recent study conducted by the James Irvine Foundation, California launched the Concurrent Courses initiative in 2008 which provided eight secondary-postsecondary partnerships to develop, enhance, and expand dual enrollment programs

with a career focus, and was tailored to underrepresented students in higher education (Hughes, Rodriguez, Edwards and Belfield, 2012). Of the students that participated, 60% were students of color and 40% came from non-English speaking homes (Hughes et al., 2012). A total of 10 colleges and 21 high schools participated in this initiative (Hughes, et al., 2012). Researchers found that participants were:

- More likely to graduate from high school;
- More likely to transition to a four-year college, rather than a two-year college;
- Less likely to take basic skills courses in college;
- More likely to persist in postsecondary education; and
- Accumulated more college credits than comparison students. (Hughes et al., 2012)

Another example of a state that is looking to include the underrepresented is Rhode Island. In 2007 a series of dual enrollment initiatives was developed that focused on the state's underserved students (ECS, 2008b).

***Dual enrollment online.*** Recently, dual enrollment has begun to receive attention among educators and policy makers for its delivery of online courses (Barnett & Stamm, 2010). According to the Education Commission of the States (2008b), 19 states have online dual enrollment programs. (Appendix A lists the states that currently have statewide online dual enrollment policies.) There have not been any comprehensive studies conducted to document the scope of online dual enrollment or student outcomes for participation in an online dual enrollment program (Barnett & Stamm, 2010). Barnett and Stamm (2010) also note that “successful participation in online courses requires

students to be more motivated, organized, independent, and technologically adept than students in traditional courses” (p. 19).

### **Tennessee’s Dual Enrollment Program**

One way that Tennessee decided to battle the costs of higher education was through the establishment of the Tennessee Education Lottery Scholarship (TELS). In November 2003, Tennesseans approved the removal of the ban on lotteries in the state constitution. The rule was filed on December 29, 2003 and became effective on April 29, 2004 (Lottery Scholarships Act, 2008). The state lottery proceeds were “earmarked” for higher education and college scholarships (Ness & Mistretta, 2009). The TELS is important to the growth of the dual enrollment program in Tennessee because a portion of the lottery revenues would later be designated to fund the Dual Enrollment Grant, which allows students to receive state funding for college courses while still enrolled in high school.

**Tennessee Education Lottery Scholarship.** The legislature decided that the Tennessee Education Lottery Scholarship (TELS) would become a merit-based scholarship that rewarded students for their academic performance in high school. Merit aid awards academically qualified students with scholarships for higher education, and have been funded through state lotteries in recent years (Ness & Noland, 2004). Ness and Mistretta (2009) conducted a comparative case study to “deepen the descriptive understanding of the merit aid adoption policy process” (p. 493). They found that Senator Steve Cohen looked into the adoption of the merit aid scholarships due to the stagnant higher education appropriations, rising cost of tuition, and “brain drain” on the “best and brightest” students in Tennessee (Ness & Mistretta, 2009, p. 503).

The TELS is modeled after Georgia's Helping Outstanding Pupils Excel (HOPE) scholarship program that was adopted in 1993 (Ness & Mistretta, 2009). The TELS program broad public policy objectives are as follows:

1. To provide financial assistance as a means to promote access to higher education;
2. To improve academic achievement in high school through scholarship incentive;
3. To retain the state's "best and brightest" students in Tennessee colleges and universities; and
4. Enhance and promote economic and community development through workforce training (Tennessee Higher Education Commission, 2011, p. 6).

In order to be eligible for the TELS, a student must either have a weighted high school GPA of 3.0 or a 21 on their ACT (College Pays, 2011c). The purpose for the TELS allowing students to be eligible if they meet the minimum GPA or ACT requirement is to allow more minority and socioeconomically disadvantaged students the opportunity to earn the HOPE scholarship (Tucker & Noland, 2006); which is approximately 65 % of high school graduates in Tennessee (Ness & Noland, 2004). Pallais (2009) notes that this is the only program that allows students to qualify through their performance on a standardized test or through their grades.

Pallais (2009) conducted a study that looked at Tennessee students' composite ACT scores from the years before the TELS, 1998, 2000, and as well as after the implementation of the TELS, 2004. The researcher observed the last time a student took the exam, stated preferences regarding aspects of their desired college, demographic and background information, and up to six colleges to which their scores were sent (Pallais, 2009). The researcher found that Tennessee students that scored below 19 on their ACT

prior to the implementation of the Tennessee Lottery Scholarship Program, and who were unsure of their ability to qualify for the scholarship, were able to increase their ACT scores after the implementation of the TELS. Pallais reported a 6.1% increase in the number of students scoring a 19 or higher on their ACT in 2004 compared to test-takers in 2000. Pallais (2009) concluded that “policies that reward students for their academic performance can potentially generate large improvements in high school achievement” (p. 217).

William Duffy (2009) conducted a quantitative study to determine if any significant differences existed in college student persistence and performance outcomes between dual credit students and non-dual credit students in Tennessee, while controlling for pre-entry attributes. Duffy measured student persistence by first year college completion and degree attainment rates, and performance by first year college GPA and degree GPA. Dual credit students participated in advanced placement (AP) and career preparation courses (CP). When comparing AP, CP, and non-dual enrollment participants, Duffy did not find any significant differences in college persistence and performance outcomes. Thus, he strongly recommended that more longitudinal studies be conducted to enhance the research in the field of dual credit.

Robert L. Robinson (2011) conducted a qualitative study in Tennessee to gain an understanding of the academic experiences of a marginalized population of students that participated in a dual enrollment program to identify the pre-collegiate experiences that may have influenced their college readiness and persistence. Participants in the program were able to share their experiences through open-ended surveys, focus group sessions, and interviews. He concluded that dual enrollment may affect the college readiness and

persistence of students by encouraging them to participate in the program, giving the participants full access to the college experience while still enrolled in high school, and help students understand their academic preferences and collegiate educational development.

Duffy (2009) and Robinson (2011) both noted that one of the limitations to their studies was the lack of historical perspective necessary to generalize their findings. They also acknowledged the importance of conducting more research in the area of the Tennessee Education Lottery Scholarship and dual enrollment program in order to enhance the understanding and the impact of these programs.

*Tennessee HOPE scholarship.* The Tennessee Education Lottery Scholarship funds several different scholarship opportunities, including: Tennessee HOPE Scholarship; General Assembly Merit Scholarship; Aspire Award; Tennessee HOPE Access Grant; Wilder-Naifeh Technical Skills Grant; and the Dual Enrollment Grant (College Pays, 2011b). One of the best known scholarships is the Tennessee HOPE Scholarship, which is defined by Tenn. Code Ann. § 49-4-902 as a “scholarship for study in pursuit of an associate or baccalaureate degree at an eligible postsecondary institution that is funded from net proceeds of the state lottery” (para. 53). The eligibility requirements to receive the HOPE scholarship include:

- Tennessee resident for one year prior to date of enrollment;
- Entering freshman must have a minimum of a 21 composite ACT (980 SAT); OR overall 3.0 weighted high school grade point average;
- Submit a Free Application for Federal Student Aid (FAFSA); and

- Be admitted to an eligible postsecondary institution (See Appendix B for listing of the institutions) (College Pays, 2011c).

For students to remain eligible to receive the HOPE scholarship they must continue to meet all initial eligibility requirements, and also must reapply for the scholarship every year. After the first two years, or forty-eight attempted hours, students must maintain a GPA of 2.75; however, in order to maintain the HOPE award for the rest of their academic terms, they must receive a 3.0 GPA (Tenn. Code. Ann § 49-4-911). It is important to note that in order for a student to remain eligible for the HOPE Scholarship, the grades earned in dual enrollment courses will not be included in their postsecondary grade point average (College Pays, 2011a). The cap or limit for receiving the HOPE scholarship is 120 credit hours or five years (College Pays, 2011c).

Patrick L. Perry (2008) conducted a study evaluating the HOPE scholarship program in Tennessee. The purpose of his quantitative study was to determine if the Tennessee HOPE Lottery Scholarship had any influence on college choice perceptions of high school students. He analyzed two years of data, 2002 and 2004, collected by the Tennessee Higher Education Commission's Senior Opinions Survey. His study assessed college choice factors by gender, ethnicity, parental income, parental education, and academic ability. The factors he identified as most influential were ranked as: cost, academic institutional characteristics, non-academic institutional characteristics, geographical factors, and people influences. There were significant differences when comparing the two different cohort years; however, the effects sizes were small. Perry concluded that the Tennessee HOPE Lottery Scholarship Program may be influencing

high school seniors' perceptions of major college choices; however, more research would be needed to identify any other contributing influential factors.

***Dual enrollment grant.*** From the TELS initiative, the Dual Enrollment Grant program was funded. The program was initiated in the 2005–2006 academic term and is defined as:

A grant for study at an eligible postsecondary institution that is funded from net proceeds of the state lottery and awarded to students who are attending an eligible high school and who are also enrolled in college courses at eligible postsecondary institutions for which they will receive college credit. (Tenn. Code Ann § 49-4-902, para. 50)

The definitions for dual enrollment and dual credit were accepted by the Tennessee P-16 Council in March 28, 2008 (Lottery Scholarships Act, 2008). Dual enrollment is defined as “a postsecondary course, taught either at the post-secondary institution or at the high school by the postsecondary faculty (may be credentialed adjunct faculty), which upon successful completion of the course allows students to earn postsecondary and secondary credit concurrently” (Burden, 2010, p. 5). Dual credit is defined as:

A postsecondary or high school course that is aligned to a post-secondary course that is taught at the high school by high school faculty for high school credit. Students are able to receive postsecondary credit by successfully completing the course, plus passing the assessment developed and/or recognized by the granting post-secondary institution. The institution will grant the credit upon enrollment of the student. (Burden, 2010, p. 6)

The difference between dual enrollment and dual credit courses are how the final course grades are assessed by the higher education institution. Students enrolled in dual enrollment courses will receive a grade on their college transcripts once they have completed the course. If students are enrolled in a dual credit course, however, they must pass an assessment developed by the higher education institution before a letter grade will be given.

In order for students to be eligible to receive the Dual Enrollment Grant they must:

1. Be a Tennessee resident as of one year prior to date of enrollment;
2. Complete the academic requirements of the 10<sup>th</sup> grade and be classified as an 11<sup>th</sup> or 12<sup>th</sup> grade student;
3. Apply for the grant in their junior and/or senior year prior to high school graduation;
4. Meet admissions criteria for dual enrollment of the postsecondary institution to which the student will enroll as a dually enrolled student; and
5. Renew the Dual Enrollment Grant application each postsecondary academic term (College Pays, 2011a).

Eligible students for the Dual Enrollment Grant are awarded \$100 per semester hour up to \$300 for one course (College Pays, 2011a). If students wish to enroll in an additional course per semester, the total amount awarded will not exceed \$600 per semester or \$1,200 per academic year. It is also important to note that if a student wishes to take multiple courses, they must meet the HOPE scholarship enrollment criteria. If students receive the Dual Enrollment Grant for more than four courses during their junior

and senior years, the amount will be deducted from their HOPE Scholarship on a dollar-for-dollar basis beginning with the fifth course (Tennessee dual enrollment grant, 2011). The deduction in HOPE Scholarship funds, however, does not count against the 120 semester hours and five-year limitation for the HOPE Scholarship. The grant can only be used for lower-division courses, and for students to remain eligible to receive grant funding they must earn at least a 2.75 on a 4.0 scale for all post-secondary courses attempted (Tennessee dual enrollment grant, 2011).

**Current Issues in Tennessee.** Since the inception of the Tennessee Education Lottery Scholarship program in 2005–2006 to 2009, over \$23.3 million in dual enrollment scholarships have been awarded (Tennessee Higher Education Commission (THEC), 2009). THEC (2009) estimates that the TELS Dual Enrollment Grant will award an additional \$45.1 million from 2010–2011 to 2013–2014 academic years. The utilization of the program by the vast number of students statewide, however, has led to many people doubting if the lottery sales in Tennessee can sustain the lottery scholarship program. Lt. Governor Ron Ramsey established a Senate Lottery Stabilization Task Force in August 2011 in order to address the rising concern for the lottery scholarship program (Lt. Governor Ramsey, 2011).

According to the Lottery Stabilization Task Force (2011), the Tennessee Education Lottery Scholarship was created in a time when higher education funding was based on enrollment numbers. However, current funding is allocated based on increased degree production, retention, transfer and degree completion (Lottery Stabilization Task Force, 2011). The four main objectives for the new regulations are: 1) to increase the number of students that complete their degrees; 2) increased retention; 3) timely

progression for degree completion; and 4) ease the transfer between 2- and 4-year institutions (Lottery Stabilization Task Force, 2011).

In November 2011, the task force reported that it voted unanimously to change the current requirement of a 21 ACT score OR 3.00 GPA, to require high school students to achieve both the ACT requirement AND the GPA requirement (Sisk, 2011). The task force did not, however, choose to change the award from merit-based to need-based (Lottery Stabilization Task Force, 2011). One of the reasons the task force voted to change the requirement is because higher education officials reported that students who met only one of the two standards were more likely to drop out of college, and would be better off beginning their college education at a two-year institution and transferring to a four-year institution (Locker, 2011). The change in requirements could reduce scholarships awarded by \$17 million a year, and the students who would be most affected by these cuts are African American students and students at Tennessee Board of Regents institutions (Sisk, 2011).

In response to the possible reduction in potential awards, the Senate Education Committee looked into the lottery reserve fund, which currently has reserves of over \$300 million, to determine if the reserve could handle any potential gaps in the lottery proceeds and the cost of the scholarship program (Locker, 2012). Despite the large sum of money in the lottery reserves, Senator Dolores Gresham plans on continuing with the plans to increase the requirements for the HOPE scholarship and other similar scholarships (Locker, 2012). When asked about the continued plans to increase the scholarship requirements, Senator Gresham said: “We’re spending more than we’re taking in. You can’t do that. Right now we have sufficient reserves to take care of

Tennessee's lottery scholarship students for a few years more, which is why the recommendations for the Lottery Task Force would not take place until 2015" (as cited in Locker, 2012, para. 6). The future of the Dual Enrollment Grant will be determined by the outcomes of the increase in standards of the HOPE scholarship.

**Current research and outcomes.** Researchers propose many benefits resulting from participation in dual enrollment programs, including: facilitating the transition to college; shorter time to degree completion; reducing the cost of higher education; enhancing the high school curriculum; and reducing the need for remedial coursework, just to name a few (Andrews, 2004; Ashburn, 2007; Bailey, Hughes & Karp, 2002; Bradley, 2007; Catron, 2001; Johnstone & Del Genio, 2001; Karp et al., 2008; Kim & Bragg, 2008; Soto, 2012). In a recent report by the Southern Regional Education Board (SREB) (2012), all of the states in the SREB, which include: Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia were surveyed. Through the SREB State Data Exchange, graduates from two- and four-year colleges in 2008–2009, found that taking college-level courses in high school decreased the time-to-degree for many graduates (SREB, 2012).

Florida's dual enrollment program has often been studied and cited because the state maintains a comprehensive student record system for all students enrolled in the public education system and tracks students through secondary and postsecondary public institutions (Karp et al., 2008). The Community College Research Center conducted a study to assess the effectiveness of dual enrollment programs in promoting high school graduation and postsecondary achievement (Karp et al., 2008). This study looked at

Florida and New York City, and examined the influence of the dual enrollment program on student participants, and compared those to students who did not participate. The researchers ran regressions in order to analyze the correlation between participation in dual enrollment and subsequent matriculation and persistence in postsecondary education.

Researchers reported positive short-term and long-term outcomes in Florida. The short-term outcomes for participation in dual enrollment included: positive relation to students' likelihood to earn a high school diploma; positive relation to college enrollment; statistically more likely to persist in college to a second semester by 4.5%; and higher postsecondary GPAs one year after high school graduation by 0.21 points (Karp et al., 2008). The long-term outcomes for participation in dual enrollment included: students were 5.4% more likely to remain enrolled in postsecondary education two years after graduating; statistically significantly higher cumulative GPAs three years after high school graduation; and had earned 15.1 more postsecondary credits three years after high school graduation (Karp et al., 2008).

Positive short- and long-term outcomes of dual enrollment participation have been reported in New York City as well (Karp et al., 2008). Students' short-term outcomes for participation in the dual enrollment programs included: 9.7% more likely to pursue a bachelor's degree as opposed to an associate degree; positive relationship between program participation and first semester GPAs; and participation in two or more courses were 3.5% more likely to enroll in college full time. The long-term outcomes for participation in the dual enrollment program included positively related overall progression toward a degree three-and-a-half years after enrolling in postsecondary

education; statistically significant higher GPAs after four semesters for participants in more than two courses; and a positive association with second year persistence for students who participated in one course (Karp et al., 2008). They also found, however, that there was no statistically significant difference if a student participated in two or more courses on second year persistence (Karp et al., 2008). The researchers concluded that the findings were encouraging; however, more research on using dual enrollment as a strategy for promoting student access and persistence in postsecondary education needs to be conducted in order to form a more definitive picture (Karp et al., 2008).

The National Center for Postsecondary Education reported that high school students in Florida who participated in “academic” dual enrollment courses did not have a significant impact on the outcomes for students in higher education (Speroni, 2012). Academic dual enrollment courses were defined for this study as courses that were introductory community college courses, other than math or English (Speroni, 2012). However, there was a significant positive correlation between participation in algebra dual enrollment courses and enrollment and graduation from college. Participation in algebra dual enrollment courses increased associate degree attainment by 23%, and also increased bachelor’s degree attainment by 24% (Speroni, 2012).

Oregon conducted a study in 2010 to analyze college performance for students who participated in their statewide dual credit program (North & Jacobs, 2010). They began by analyzing high school students who participated in the dual credit program in 2007–2008 school year. The Oregon Department of Education (2013) defines dual credit as “awarding secondary and postsecondary credit for a course offered in a high school during regular hours” (para. 1). The term dual credit is interchangeable with the term dual

enrollment in this study. There were two research questions that lead their study: 1) Do high school students who take dual credit courses succeed when they go on to college?; and 2) Does dual credit instruction do as well as college-situated instruction in preparing students for subsequent college coursework?

In order to answer the first question about dual credit students' success in college, they found several key indicators of success:

- 81.4% of students who participated in the dual credit program enrolled in postsecondary education, compared to 72.6% of Oregon's high school graduating class;
- 87% of students who took dual credit courses persisted into their second year of college, compared to 79.9% of those who did not participate;
- Students who participated in dual credit courses and persisted on to a second year of college earned on average a 3.13 GPA, compared to an average of 2.97 for those who did not take dual credit courses; and
- Dual credit students who persisted on to a second year of college accumulated more college credits than their non dual credit cohort (North & Jacobs, 2010).

In answering the second question, researchers found that students who were instructed by high school dual credit instructors did as well as students who were instructed by college instructors. It is important to note that dual credit students did earn a lower average grade in the final term, but their pass rates were largely equivalent to those who were instructed by college instructors (North & Jacobs, 2010).

Unfortunately, despite all the proposed positive outcomes for participation in dual enrollment, many researchers have commented on the lack of quantifiable supporting

data for dual enrollment programs (Allen, 2010; Andrews, 2004; Karp et al., 2008; Kim & Bragg, 2008). In Arizona, a tax reform group has scrutinized the funding for dual enrollment programs and termed it “double dipping” (Farrell & Seifert, 2007, p. 71). Some of the other issues and concerns with dual enrollment programs are: variation in state policies; uncertain academic quality of dual enrollment courses; capability of high school teachers serving as postsecondary adjuncts; transferability of credits; and cost of the program (Dougan, 2005; Farrell & Seifert, 2007; Johnstone & Del Genio, 2001; Krueger, 2006).

Farrell and Seifert (2007) studied community colleges in an urban region in Arizona that offered dual enrollment courses. College administrators, upon closer inspection of their program, found that other four-year postsecondary institutions were not accepting the dual enrollment credits (Farrell & Seifert, 2007). The four-year colleges were concerned that the dual enrollment courses did not meet the rigor of college courses and did not prepare students adequately because the high school teachers were not qualified to teach the courses. As a result of the evaluation of the program, the administrators created a new model in which students are required to take an assessment that covers reading, writing, and math in order to qualify them for dual enrollment courses. Before students take the assessment, they must obtain permission to take the course from their parent or guardian, and from a high school counselor; and by obtaining permission, students are “required to take responsibility for their academic future” (Farrell & Seifert, 2007, p. 71).

Dougan (2005), a former vice president of instruction and institutional effectiveness at Jackson State Community College, criticized dual enrollment initiatives

calling them the “pitcher principle” of education (Dougan, 2005, para. 8). She claims the “pitcher principle” indicates that:

Learning can be poured into a student and that when the pitcher is full, a student should receive a degree. A student must simply occupy a seat in a set number of classes, perform adequately on objective (multiple-choice or true-or-false) tests, and, after attending the required number of courses, emerge as a certified graduate. (Dougan, 2005, para. 8)

She concludes by saying “the ‘pitcher principle’ is the fast track to academic disaster” (Dougan, 2005, para. 16).

### **Summary**

Dual enrollment programs have grown significantly since the 1970s; however, the documented growth is not without some growing pains. Farrell and Seifert (2007) concluded that “a key factor leading to the success, or in its absence the failure, of a dual-enrollment program is an explicit understanding of the goals and motives of all parties involved” (p. 75). Along with clear communication between all parties, they also concluded that “all constituents in the process—including students—should examine and delineate their desired outcomes before becoming involved” (Farrell & Seifert, 2007, p. 75). This directly coincides with Astin’s (1984, 1993a, 1999) Student Involvement Theory and Input-Environment-Outcomes (I-E-O) model because of the involvement, planning, and development that goes into preparing for one’s academic future.

Tennessee has seen tremendous growth in the dual enrollment program since the implementation of the Dual Enrollment Grant. The Dual Enrollment Grant provides financial assistance for high school students who participate in dual enrollment courses.

Students who earn the dual enrollment credit will earn credit toward their high school diploma and also transcribed college credit.

Researchers propose that there are many benefits to participating in dual enrollment courses including: facilitating the transition to college; shorter time to degree completion; reducing the cost of higher education; enhancing the high school curriculum; and reducing the need for remedial coursework, just to name a few (Ashburn, 2007; Bailey et al., 2002; Bradley, 2007; Catron, 2001; Karp et al., 2008; Johnstone & Del Genio, 2001; Kim & Bragg, 2008).

## **Chapter 3**

### **Methodology**

The purpose of this study was to examine students' academic performance, retention, and degree attainment at the University of the Mid-South, after their participation in the institution's high school based dual enrollment program. A group of dual enrollment students were compared to other students within their academic cohort who entered the academic institution with similar pre-entry educational characteristics. In this chapter, the researcher discusses the methods and statistical procedures that were used to address the proposed research questions:

1. Does student participation in dual enrollment courses have any influence on first year retention for first-time, full time freshmen after controlling for students' pre-entry academic characteristics?
2. Does student participation in dual enrollment courses have any influence on students' cumulative GPA after one academic year for first-time, full time freshmen after controlling for students' pre-entry academic characteristics?
3. Does student participation in dual enrollment courses have any influence on time to graduation for first-time, full time freshman after controlling for students' pre-entry academic characteristics?

### **Research Design**

The researcher used quantitative statistical measures to examine students' higher education performance. Specifically, she used the University of the Mid-South's institutional data to analyze students' higher education academic performance after participating in the institution's high school based dual enrollment program. Due to the

fact that the data has already been collected and analyzed by the institution for other purposes, this study was classified as secondary analysis. Secondary analysis is defined as “any further analysis of an existing dataset which presents interpretations, conclusions, or knowledge additional to, or different from, those presented in the first report on the inquiry as a whole and its main results” (Hakim, 1982, p. 1). According to Hakim (1982), there are several types of inquiries that lend themselves to secondary analysis: condensed reports; detailed reports; reports that focus on a particular sub-topic or social group; reports that look at a specific policy issue or question; analyses based on a conceptual framework or theory not applied to the original analysis; and reanalysis in order to take advantage of more advanced analytic techniques than used in the original report.

“Technical and organizational developments have facilitated access to existing social datasets, enabling researchers to carry out secondary analyses additional to, and commonly very different from, those of the researcher who collected the data” (Hakim, 1982, p. 3). This study lends itself to the use of secondary analysis because the researcher was granted access to files that were initially collected for other purposes. For example, this study expanded the current research on the dual enrollment programs in Tennessee, and determined if the current policy objectives of the program are being achieved. The researcher collaborated with administrators at the University of the Mid-South to access the institution’s data warehouse to retrieve aggregate data for this study. Aggregate data is defined as “statistics or tables produced from microdata, relating to broad groups, areas, or categories, and in which the characteristics of particular respondents are no longer identifiable” (Hakim, 1982, p. 2).

The Institutional Review Board (IRB) requires approval for all studies with human subjects. Human subjects are defined as a “living individual about whom an investigator (whether professional or student) conducting research obtains data through intervention or interaction with the individual, or identifiable private information” (Collaborative Institutional Training Initiative, 2012, para. 21). Since the researcher tracked students’ retention and progress toward degree completion at the University of the Mid-South, exempt approval from the IRB was attained. (See Appendix C for IRB approval.)

**Setting.** The University of the Mid-South is a four-year public university that has been granted a Carnegie classification of RU/H for a research university with high research activity (Carnegie Foundation, 2012). The undergraduate student body demographic at UMS consists of 50.3% White, 39.2% Black, and 10.5% other; of which 40% are men and 60% are women (Office of Institutional Research (OIR), 2011). The total enrollment for fall 2012 was over 20,000 (University of the Mid-South, 2012b). According to UMS’ Office of Institutional Research, the university is dedicated to the transfer and dissemination of knowledge to its student body and the community in which it serves, as well as respect for diversity, integrity, responsible stewardship, leadership and involvement in the economic, social and professional growth in Tennessee and around the nation (University of the Mid-South, 2012c).

The University of the Mid-South’s four-year graduation rate for first-time, full-time freshmen is 13.1%, and the six-year graduation rate is 39.1% (OIR, 2011). The four-year graduation rate is based on information retrieved from the fall 2007 cohort, and the six-year cumulative graduation rate is based on information retrieved about the fall

2005 cohort (OIR, 2011). The four-year graduation rate for the fall 2007 cohort increased from 11.9% from the fall 2005 cohort (OIR, 2011). A degree year includes consecutive summer, fall, and spring terms (OIR, 2011).

***Dual enrollment.*** The University of the Mid-South developed a high school based dual enrollment program in the fall of 2006, after the initiation of the Dual Enrollment Grant in the fall of 2005 by the Tennessee state lottery. As previously mentioned, the Dual Enrollment Grant awards students financial assistance for enrolling in college courses while also being enrolled in high school, and is funded by state lottery proceeds. The dual enrollment program through the University of the Mid-South is a high school based program, and as of the fall 2011, 16 area high schools participated in the dual enrollment program (W. Akey, personal communication, March 12, 2012). The requirements for students to participate in the institution's dual enrollment program include:

1. A minimum 19 composite ACT score;
2. A minimum of 18 on the English sub-score on the ACT if the student is taking English Composition;
3. A minimum of 19 on the Math sub-score on the ACT if the student is taking college math;
4. A 100 admissions index score. This score is calculated by taking 30 times the high school GPA plus the composite ACT. (University of the Mid-South, 2012a)

The admissions index score is a probability of success indicator that takes into account student's high school grade point average and standardized test score.

Not to be confused with the high school based dual enrollment program, the University of the Mid-South also has a concurrent enrollment program. UMS differentiates between dual enrollment and concurrent enrollment based on location of coursework. The concurrent enrollment program allows high school students to attend courses on the college campus. The admissions requirements for the concurrent enrollment courses are more selective than the requirements for the high school based dual enrollment program. The specific requirements for concurrent enrollment students are:

1. A minimum high school cumulative grade point average (GPA) of 3.20 on a 4.00 scale;
2. An ACT composite score of 22 or above;
3. A recommendation from the applicant's high school principal or guidance counselor;
4. The course the student is concurrently enrolled in must be taken outside of their established school day. (University of the Mid-South, 2012a)

For this study, the researcher focused on students who participated in the high school based dual enrollment program.

**Variables.** This study compared two groups of students: those who participated in the high school based dual enrollment program, and those who did not participate in the dual enrollment program but had similar pre-entry educational characteristics. The Personal Identification Master (PIDM) was used to match data points to an individual across multiple files. The PIDM is an internal identification number associated with each

student’s institutional record. The number cannot be used to identify individual students, and is not found on any Banner form or through self-service.

Only students who enrolled full-time and graduated from high school within the same year they enrolled at UMS were included in this study. Students with similar pre-entry academic characteristics were selected based on two variables: a minimum 2.5 high school GPA, and a minimum 19 ACT composite score. Table 1 displays the variable requirements for participants to be included in this study.

Table 1

*Specific Student Characteristics Required for this Study*

<b>Variable</b>	<b>Reason</b>
Enrollment Status	Students must be enrolled full time their freshman term to be included in this study.
HS GPA	Minimum 2.5 on 4.0 scale
HS Graduation Date	Students must have graduated HS within the same year as institutional enrollment
ACT	Minimum 19 composite

***Independent variables.*** In order to examine if participation in the institution’s dual enrollment program had any impact on students’ retention, academic development and higher education achievement, several variables were used to address the research questions in this study. The independent variables for this study include: participation in the institution’s high school based dual enrollment program, gender, race, maximum composite ACT score, GPA, and academic cohorts. The variable race was broken down into four categories: White, Black, other, and unknown. The category other includes

students who identified their race as: Alaskan Native, American Indian, Asian, Hispanic, Pacific Islander, and two or more races. Table 2 lists the independent variables and their definition.

Table 2

*Independent Variables*

Variable	Definition/Code
Dual Enrollment Program Participation	1 = participated, 0 = did not participate
ACT (composite)	Quartile 1 – 19-21, Quartile 2 – 21.01-23, Quartile 3 – 23.01-26, Quartile 4 – 26.01-36
Cohort	2008, 2009, 2010, 2011
Gender	Male = 0, Female = 1
HS GPA	Quartile 1 – 2.5-2.94, Quartile 2 – 2.941-3.31, Quartile 3 – 3.311-3.70, Quartile 4 – 3.701-4.0
Race	1 = White, 2 = Black, 3 = Others, 4 = Unknown

***Dependent variables.*** In order to address the three research questions, the researcher has identified three dependent variables: retention, end of first year cumulative GPA, and graduation. Table 3 lists the dependent variables for this study and their definitions. These variables were chosen specifically because they represent academic performance and progress toward degree completion.

Table 3

*Dependent Variables*

<b>Variable</b>	<b>Definition/Code</b>
Retained	1 = retained, 0 = not retained
1 <sup>st</sup> year GPA (cumulative)	4.0 scale
Graduation (institution)	1 = Graduated within 4 years, 0 = Unknown Graduation Date

The dependent variable for research question one is retention. In order to determine if a student was retained from one academic year to another, the PIDM numbers for the first-time, full-time freshmen data files were compared to the undergraduate data files for the following fall term. The dichotomous, categorical nature of retention, retained or not retained, lends itself to the creation of a dummy variable (Pampel, 2000). If a student was retained they were given the value of one, and if a student was not retained they were given a value of zero. Dummy variables are created in order to interpret a categorical variable because the numbers assigned to the group are arbitrary.

The dependent variable for research question two is cumulative GPA. The mean cumulative GPA for dual enrollment participants was compared to the mean cumulative GPA for non-dual enrollment participants. The means and variances for the groups were computed to determine if the sample means differ more than what would be expected due to chance (Hinkle, Wiersma, & Jurs, 2003).

The dependent variable for research question three is time to graduation. In order to determine if a student has graduated, the PIDM numbers for first-time full-time

freshmen were compared to the graduation data files. Ishitani (2006) used multiple logistic regression models to analyze time to degree attainment because of “the dichotomous nature of degree completion” (p. 866). The dichotomous, categorical nature of graduation, graduated or did not graduate, lends itself to the creation of dummy variables (Pampel, 2000). If a student graduated they were given a value of zero, and if the student did not graduate they were assigned a value of one.

**Population.** The population for this study included all first-time, full-time freshmen who enrolled at the University of the Mid-South from fall 2008 through fall 2011. The researcher worked with UMS’ Office of Institutional Research to extract the student data from the institution’s student information system (SIS), Banner. The Banner system was adopted by the university in the fall of 2007 and contains all student academic performance records, demographic information, and pre-entry characteristics related to high school performance and achievements. At the onset of this study, the researcher had intended to include the 2007 first-time, full-time freshmen data files; however, the reliability of the data set was questioned, so a decision was made to not include it in the final analysis.

University officials provided 17 data files in four categories: dual enrollment participants from 2006 through 2010; first-time, full-time freshman files from fall 2007 through fall 2011; undergraduate enrollment files from fall 2008 through fall 2012; and graduation files for 2010-2011 and 2011-2012. As previously mentioned, a PIDM number was provided for each student in each data file. The researcher was able to join student information in different files by linking the PIDM numbers.

First, the dual enrollment files were combined with the first-time, full-time freshmen data files. By combining the dual enrollment data files with the first-time, full-time freshman files, the researcher was able to identify the individuals who participated in the dual enrollment program and who enrolled at UMS after high school graduation. Approximately 24.8% of students who participated in the high school based dual enrollment program enrolled as first-time, full-time freshman at the University of the Mid-South the following fall term. The number of students who participated in the institution’s dual enrollment program and those who enrolled at UMS after high school graduation is depicted in Table 4.

Table 4

*Dual Enrollment Participants*

	DE Participants	Enrolled at UMS	Percent Enrolled
2006	143	39	27.3%
2007	236	61	25.8%
2008	311	85	27.3%
2009	429	105	24.5%
2010	530	119	22.5%
Total	1649	409	24.8%

Then, the researcher evaluated the first-time full-time freshmen files to determine how many students met the requirements to be included in this study. As previously stated, students were included in this study if they had a minimum high school GPA of

2.5, a minimum ACT composite score of 19, graduated from high school within the same year of enrolling in college, and were enrolled as full-time students. These academic qualifications were selected because it is the baseline requirements for participating in the dual enrollment program. Based on the required criteria, 6377 students, or 68.3%, who enrolled as first-time, full-time freshmen were included in this study. Table 5 presents the sample of students who met the requirements to be included in this study.

Table 5

*Students Included in the Study*

	FR Population	FR Sample	Percent Included
2008 Cohort	2033	1396	68.7%
2009 Cohort	2272	1557	68.5%
2010 Cohort	2436	1653	67.9%
2011 Cohort	2589	1771	68.4%
Total	9330	6377	68.3%

*Note.* Students were included if they met the pre-entry academic requirements, were enrolled full-time, and had graduated from high school within that same year.

Table 6 presents the descriptive statistics of all the explanatory variables included in this study.

Table 6

*Descriptive Statistics for the Study Sample*

Variable	Label	Count	Percent
Cohort	2008*	1396	21.9%
	2009	1557	24.4%
	2010	1653	25.9%
	2011	1771	27.8%
Gender	Male*	2731	42.8%
	Female	3646	57.2%
Race	White*	3751	58.8%
	Black	1895	29.7%
	Other	580	9.1%
	Unknown	151	2.4%
Institutional Dual Enrollment Participation	Yes	370	5.8%
	No	6007	94.2%
Retention	Yes	5077	79.6%
	No	1300	20.4%
ACT	19-21*	2233	35.0%
	21.01-23	1386	21.7%
	23.01-26	1511	23.7%
	26.01-36	1247	19.6%
HS GPA	2.5-2.94*	1407	22.1%
	2.941-3.31	1469	23.0%
	3.311-3.70	1707	26.8%
	3.701-4.0	1794	28.1%

*Note.* Columns may not add up to 100.0 due to rounding.

\*Reference groups for logistic regressions.

**Statistical analysis.** Quantitative measures were used to analyze the data and to answer the research questions for this study. The Statistical Package for the Social Sciences (SPSS) version 20 was used. In order to conduct the analysis, the 17 existing data sets were merged and variables were coded as necessary.

First, descriptive statistics and Pearson Chi-squared analyses were conducted. The descriptive statistics were used to address all three research questions. Comparisons were made for students who were retained from one year to the next and graduation. The two-sample Chi-square tests allowed for analysis of variables that contain two or more categories (Hinkle et al., 2003). The observed frequencies were compared to the expected frequencies to determine any significant difference (Hinkle et al., 2003).

Then, the researcher ran logistic regression analyses for retention and graduation because the two-sample Chi-square tests omitted the effects of different independent variables on the dependent variable (Hinkle et al., 2003). Logistic regressions are used to “determine the impact of multiple independent variables presented simultaneously to predict membership of one or other of the two dependent variable groups” (Burns & Burns, 2008, p. 569). The binary logistic regression equation is expressed as:

$$Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \dots + \beta_k\chi_k$$

where  $Y$  is the log odds of the binary dependent variable,  $\beta_0$  is the constant,  $\beta_1$  through  $\beta_k$  are the logistic regression coefficients, and  $\chi$  are the independent variables (Menard, 2002).

Similar to the function of  $F$  and  $R^2$  statistic in linear regression, logistic regression uses the *log likelihood* as the criterion for selecting parameters, and the goodness-of-fit  $\chi^2$  statistic to determine the unexplained variation in the model (Menard, 2002).

Specifically, the Omnibus Tests of model coefficients and the Hosmer and Lemeshow goodness-of-fit tests were evaluated in this analysis. Hosmer and Lemeshow’s goodness-of-fit index was designed for casewise data and is common when using dichotomous dependent variables (Menard, 2002).

Unlike linear regression assumptions, logistic regression does not assume that the predictor variables are normally distributed, and does not assume linearity between dependent and independent variables (Menard, 2002; Pampel, 2000; Peng, Lee, & Ingersoll, 2002). The odds ratios are then provided in order to interpret the impact of each independent variable on the probability of a certain outcome (Pampel, 2000). The odds ratios are used in the following formula to determine the relative risk or the “percentage increase or decrease due to one-unit change in the independent variable:  $\% \Delta = (e^b - 1) * 100$ ” (Pampel, 2000, p. 23).

In order to analyze first year cumulative GPA, an independent sample *t*-test was conducted. The independent sample *t*-test allows for a comparison of the means between two different groups, the dual enrollment students and the non-dual enrollment students (Hinkle et al., 2003). The effect size, also known as Cohen’s *d*, was calculated to determine the magnitude of the statistical difference (Hinkle et al., 2003). The independent and dependent variables included in each research question were provided in Table 2 and Table 3.

## **Summary**

The dual enrollment program at the University of the Mid-South has grown and continues to develop after the implementation of the Dual Enrollment Grant in Tennessee. In order to determine whether the goals of the dual enrollment program are being met, the researcher has proposed three research questions to address retention, GPA, and time to graduation. The researcher was able to add to the growing body of literature for dual enrollment programs by conducting Pearson Chi-squared analyses, multiple logistic regression models, and an independent *t*-test to address the research

questions. As previously mentioned, it is important to run the logistic regression analysis after the chi-squared analysis because the chi-square analysis omits the effect of the other independent variables on the dependent variable.

## Chapter 4

### Results

The purpose of this study was to examine students' academic performance, retention, and degree attainment at the University of the Mid-South, after their participation in the institution's high school based dual enrollment program. As previously discussed in chapter 3, the independent variables are: participation in the institution's high school based dual enrollment program, gender, race, max composite ACT score, and the academic cohorts (Table 2). The dependent variables are: retention, first year cumulative GPA, and time to graduation (Table 3).

This chapter will cover the statistical procedures that were used to address the research questions for this study:

1. Does student participation in dual enrollment courses have any influence on first year retention for first-time, full time freshmen after controlling for students' pre-entry academic characteristics?
2. Does student participation in dual enrollment courses have any influence on students' cumulative GPA after one academic year for first-time, full time freshmen after controlling for students' pre-entry academic characteristics?
3. Does student participation in dual enrollment courses have any influence on time to graduation for first-time, full time freshman after controlling for students' pre-entry academic characteristics?

To address research question 1, Pearson Chi-square analyses were conducted on all the independent variables and retention, and then a binary logistic regression analysis was conducted to determine the overall impact of the independent variables on retention.

Then, to address research question 2, an independent sample *t*-test was conducted to

determine if there was any significant difference between the mean GPAs for the dual enrollment and non-dual enrollment student groups. Finally, to address research question 3, Pearson Chi-square analyses were conducted on all the independent variables and graduation, and then a binary logistic regression analysis was conducted to determine the overall impact of each independent variable on graduation.

### **Research Question 1**

First, Pearson Chi-square analyses were conducted between all the independent variables and retention. Then, a logistic regression analysis was conducted to determine the significance of the interaction of all the independent variables on retention. As previously mentioned, logistic regression analysis was important because Chi-square analyses do not account for the interaction effect of the group of independent variables on the dependent variable. The total sample size was 6377 ( $n = 6377$ ).

**Chi-square analysis for retention by variable.** For this question, there were six independent variables: dual enrollment participation, gender, ACT, Cohort year, high school GPA, and race.

**Dual enrollment.** From fall 2008 through the fall 2011 term, 84.1% of the students who had participated in the institution's high school based dual enrollment program were retained for one year. In that same time frame, 79.3% of the students who did not participate in the institution's dual enrollment program were retained. The difference in retention by participation in the institution's high school based dual enrollment program was found to be statistically significant,  $\chi^2 (1, N = 6377) = 4.77, p = 0.03$ .

Table 7

*Frequencies for Dual Enrollment and Retention*

Variable	Retained	Not Retained	$\chi^2$	<i>p</i>
	<i>n</i> = 5077	<i>n</i> = 1300		
Dual Enrollment				
Yes	311	59	4.77	*
No	4766	1241		

\**p* < 0.05.

**Gender.** When evaluating the students who were retained, more females were retained. The difference in retention between male and female students was found to be statistically significant,  $\chi^2(1, N = 6377) = 22.95, p = 0.00$ .

Table 8

*Frequencies for Gender and Retention*

Variable	Retained	Not Retained	$\chi^2$	<i>p</i>
	<i>n</i> = 5077	<i>n</i> = 1300		
Gender				
Male	2098	633	22.95	**
Female	2979	667		

\*\**p* < 0.01.

**ACT.** Students with higher ACT scores were more likely to be retained from one year to the next. These differences were found to be statistically significant,  $\chi^2(3, N = 6377) = 47.70, p = 0.00$ . Additional information about students ACT scores is provided in Table 9.

Table 9

*Frequencies for ACT and Retention*

Variable	Retained	Not Retained	$\chi^2$	<i>p</i>
	<i>n</i> = 5077	<i>n</i> = 1300		
ACT				
19-21	1701	532	47.70	**
21.01-23	1084	302		
23.01-26	1224	287		
26.01-35	1068	179		

\*\**p* < 0.01.

**Cohort.** The academic cohorts were divided into four groups: 2008, 2009, 2010, and 2011. With regards to retention, the differences between the cohort groups were not found to be statistically significant at alpha level 0.05,  $\chi^2$  (3, *N* = 6377) = 0.63, *p* = 0.89. Additional information about the academic cohorts is provided in Table 10.

Table 10

*Frequencies for Academic Cohort and Retention*

Variable	Retained	Not Retained	$\chi^2$	<i>p</i>
	<i>n</i> = 5077	<i>n</i> = 1300		
Cohort				
2008	1109	287	0.63	
2009	1242	315		
2010	1325	328		
2011	1401	370		

\**p* < 0.05.

**HS GPA.** Students with higher high school GPAs were more likely to be retained. The difference in retention by high school GPA was found to be statistically significant,

$\chi^2 (3, N = 6377) = 265.98, p = 0.00$ . Additional information about students' high school GPA is provided in Table 11.

Table 11

*Frequencies for HS GPA and Retention*

Variable	Retained <i>n</i> = 5077	Not Retained <i>n</i> = 1300	$\chi^2$	<i>p</i>
HS GPA				
2.5-2.94	954	453	265.98	**
2.941-3.31	1104	365		
3.311-3.70	1404	303		
3.701-4.0	1615	179		

\*\**p* < 0.01.

**Race.** With regards to retention, 78.5% of students who identified their race as White were retained, 80.1% of students who identified their race as Black were retained, 85.3% of students who were classified in the category others were retained, and 80.1% of students who did not identify a race were retained. The difference in retention between different racial groups was found to be statistically significant,  $\chi^2 (3, N = 6377) = 14.93, p = 0.002$ . Additional information about race is provided in Table 12.

Table 12

*Frequencies for Race and Retention*

Variable	Retained	Not Retained	$\chi^2$	<i>p</i>
	<i>n</i> = 5077	<i>n</i> = 1300		
Race				
White	2944	807	14.93	**
Black	1517	378		
Other	495	85		
Unknown	121	30		

\*\**p* < 0.01.

**Logistic regression analysis for retention.** Binary logistic regression analysis was then employed to examine the factors that influenced student retention. The dependent variable examined was whether a student was retained from one academic year to the next. First, the model was analyzed based on the Omnibus Tests of model coefficients and the Hosmer and Lemeshow goodness-of-fit test. The Omnibus Test of model coefficients was significant ( $\chi^2$  (14, *N* = 6377) = 307.92, *p* = 0.00), indicating that there is some predictive capacity in the regression equation. Next, the Hosmer and Lemeshow goodness-of-fit test failed to reject the null hypothesis ( $\chi^2$  (8, *N* = 6377) = 2.85, *p* = 0.94). The null hypothesis states that there is no difference between the models. Since the null hypothesis was not rejected, this indicates that there is a difference between the models, thus there is some predictive capacity of the model once all the variables were included.

Then, the resulting odds ratios were interpreted in relation to the probability that students were retained from one academic year to the next. Factors that were found to be statistically significant for increasing or decreasing the odds of retention when other

variables are controlled for were: female students were 24% more likely to be retained than males, having a high ACT score, having a higher high school GPA, and by race.

In order to look more closely at the variable composite ACT score, dummy variables were created. The ACT scores were broken down into four quartiles, and the breakdown of each quartile can be found in Table 6. The reference group used to compare ACT scores was the first quartile. Students who scored in the fourth quartile were 31% more likely to be retained. These differences were statistically significant when compared to students who scored in the first quartile. Students who scored in the second and third quartiles, however, were not significantly retained over students who scored in the first quartile.

In order to look more closely at the variable high school GPA, dummy variables were created. The high school GPAs were also broken down into four quartiles, and the breakdown of each quartile can be found in Table 6. The reference group used to compare high school GPA was the first quartile. When compared to students who scored in the first quartile on high school GPA, students in the second quartile were 39% more likely to be retained, students who scored in the third quartile were 1.08 times more likely to be retained, and students who scored in the fourth quartile were 2.83 times more likely to be retained.

In order to look more closely at the variable race, dummy variables were created. The reference group used to compare race was the White student group. Black students were 24% more likely to be retained than their White peers. The group classified as others were 59% more likely to be retained than their White peers. As previously mentioned in chapter 3, the race category others includes students who identified their

race as: Alaskan Native, American Indian, Asian, Hispanic, Pacific Islander, and two or more races. There was no significant difference between the White students and the students who did not indicate a race and were classified as unknown.

Factors that were not found to be statistically significant for increasing or decreasing the odds of retention when other variables are controlled for were: participation in a dual enrollment program, and academic cohort. Dummy variables for academic cohort were created by year and were referenced to the 2008 cohort, to see if there was any significance by year that might have been missed in the overall analysis. However, all of the cohorts were still found to be insignificant. Table 13 presents the logistic regression results for predicting retention.

Table 13

*Logistic Regression Results Predicting Retention*

Predictor	B	SE	<i>p</i>	Relative Risk	95% CI
Dual Enrollment	0.17	0.15		0.18	[0.88, 1.59]
Gender	0.21	0.06	**	0.24	[1.09, 1.41]
ACT					
21.01-23	0.13	0.09		0.14	[0.96, 1.35]
23.01-26	0.15	0.09		0.16	[0.97, 1.39]
26.01-36	0.27	0.11	*	0.31	[1.05, 1.63]
Cohort					
2009	-0.02	0.09		-0.02	[0.81, 1.17]
2010	-0.04	0.09		-0.04	[0.80, 1.15]
2011	-0.13	0.09		-0.12	[0.73, 1.05]
HS GPA					
2.941-3.31	0.33	0.08	**	0.39	[1.18, 1.64]
3.311-3.70	0.73	0.09	**	1.08	[1.75, 2.47]
3.701-4.0	1.34	0.11	**	2.83	[3.11, 4.71]
Race					
Black	0.22	0.08	**	0.24	[1.06, 1.45]
Others	0.46	0.13	**	0.59	[1.24, 2.04]
Unknown	0.13	0.22		0.14	[0.75, 1.74]
Constant	0.51	0.10	**	1.66	

*Note.* Dummy variables were created for ACT, Cohort, HS GPA, and race

Cut value 0.50

\**p* < 0.05. \*\**p* < 0.01.

**Research Question 2**

In order to address the second research question, an independent sample *t*-test was conducted to measure GPA after one year enrolled at UMS. In this analysis, the test for homogeneity of variance was significant (Levene (1, 6377) = 23.63, *p* = 0.00) indicating that the assumption of homogeneity of variance was not met. Since this assumption was

not met, the adjusted degrees of freedom (435.99) and the unequal variances estimate of the standard error were used to calculate the *t*-test (Hinkle et al., 2003). The independent *t*-test indicated that there were significant differences in the means of the two groups ( $t(435.99) = 5.12, p = 0.00$ ). The effect size calculated for the difference is large ( $d = 4.89$ ).

Table 14

*Comparison of Means by Dual Enrollment Participation Classification*

Group	<i>M</i>	<i>SD</i>	<i>n</i>	<i>df</i>	<i>t</i>	<i>p</i>
DE Participants	3.01	0.87	370	-	-	-
Non-DE Participants	2.76	1.04	6007	435.99	5.12	**

\*\*  $p < 0.00$ .

### Research Question 3

In order to address the third research question, Pearson Chi-square analyses were conducted between all the independent variables and graduation. Then, a logistic regression analysis was conducted to determine the significance of the interaction of all the independent variables on graduation. Due to the fact that only five years of data were collected, the researcher only analyzed time to graduation for the 2008 cohort. The total sample for this cohort year was 1,396 students ( $n = 1396$ ).

**Chi-square analysis for graduation by variable.** For this question, there were five independent variables: dual enrollment participation, gender, ACT, HS GPA, and race.

**Dual enrollment.** Of the 1,396 students who had enrolled as first-time, full-time freshmen in the fall of 2008, 61 (4.4%) of them had participated in the institution's high

school based dual enrollment program. Of the students who had participated 24.6% graduated within the four years, and of the students who did not participate 15.2% graduated. The difference in graduation by participation in the institution's high school based dual enrollment program and non-participation was found to be statistically significant at alpha level 0.05,  $\chi^2 (1, N = 1396) = 3.90, p = 0.05$ . Additional information about dual enrollment participation and graduation is provided in table 15.

Table 15

*Frequencies for Dual Enrollment and Graduation*

Variable	Graduated <i>n</i> = 218	Not Graduated <i>n</i> = 1178	$\chi^2$	<i>p</i>
Dual Enrollment				
Yes	15	46	3.90	*
No	203	1132		

\* $p < 0.05$ .

**Gender.** When evaluating the students who had graduated, 63.8% of them were female. The difference in time to graduation between male and female students was found to be statistically significant,  $\chi^2 (1, N = 1396) = 4.40, p = 0.04$ . Additional information about gender is provided in table 16.

Table 16

*Frequencies for Gender and Graduation*

Variable	Graduated	Not Graduated	$\chi^2$	<i>p</i>
	<i>n</i> = 218	<i>n</i> = 1178		
Gender				
Male	79	517	4.40	*
Female	139	661		

\*\**p* < 0.01.

**ACT.** Students with higher ACT scores were more likely to have graduated within the time frame of this study. These differences were found to be statistically significant,  $\chi^2 (3, N = 1396) = 82.01, p = 0.00$ . Additional information about ACT scores is provided in table 17.

Table 17

*Frequencies for ACT and Graduation*

Variable	Graduated	Not Graduated	$\chi^2$	<i>p</i>
	<i>n</i> = 218	<i>n</i> = 1178		
ACT				
19-21	35	439	82.01	**
21.01-23	38	279		
23.01-26	64	290		
26.01-35	81	170		

\*\**p* < 0.01.

**HS GPA.** Students who had earned higher high school GPAs were more likely to graduate. The difference in graduation by high school GPA was found to be statistically significant,  $\chi^2 (3, N = 1396) = 108.50, p = 0.00$ . Additional information about students' high school GPAs is provided in table 18.

Table 18

*Frequencies for HS GPA and Graduation*

Variable	Graduated	Not Graduated	$\chi^2$	<i>p</i>
	<i>n</i> = 218	<i>n</i> = 1178		
HS GPA				
2.5-2.94	19	336	108.50	**
2.941-3.31	30	313		
3.311-3.70	61	297		
3.701-4.0	108	232		

\*\**p* < 0.01.

**Race.** In the four years since initial enrollment, 18.4% of White students, 7.5% of Black students, 21.5% of other students, and 15.4% of unknown students had graduated. The difference in graduation between different racial groups were found to be statistically significant,  $\chi^2(3, N = 1396) = 26.95, p = 0.00$ .

Table 19

*Frequencies for Race and Graduation*

Variable	Graduated	Not Graduated	$\chi^2$	<i>p</i>
	<i>n</i> = 218	<i>n</i> = 1178		
Race				
White	159	703	26.95	**
Black	28	347		
Other	23	84		
Unknown	8	44		

\*\**p* < 0.01.

**Logistic regression for graduation.** Binary logistic regression analysis was then employed to examine the factors that influenced student retention. The dependent variable examined was whether a student graduated or not. First, the model was analyzed

based on the Omnibus Tests of model coefficients and the Hosmer and Lemeshow goodness-of-fit test. The Omnibus Test of model coefficients was significant ( $\chi^2 (11, N = 1396) = 152.72, p = 0.00$ ), indicating that there is some predictive capacity in the regression equation. Next, the Hosmer and Lemeshow goodness-of-fit test failed to reject the null hypothesis ( $\chi^2 (8, N = 1396) = 6.93, p = 0.54$ ). The null hypothesis states that there is no difference between the models. Since the null hypothesis was not rejected, this indicates that there is a difference between the models, thus there is some predictive capacity of the model once all the variables were included.

Then, the resulting odds ratios were interpreted in relation to the probability that students would graduate. Participation in the institution's high school based dual enrollment program did not statistically increase or decrease the odds of graduating. Factors that were found to be statistically significant for increasing or decreasing the odds of graduating when other variables are controlled for were: females were 59% more likely than males, having a higher ACT score, having a higher high school GPA, and race.

In order to look more closely at the variable composite ACT score, dummy variables were created. The ACT scores were broken down into four quartiles, and the breakdown of each quartile can be found in Table 6. The reference group used to compare ACT scores was the first quartile. Students who scored in the third quartile were 61% more likely, and students who scored in the fourth quartile were 1.74 times more likely to graduate than students in the first quartile. Students who scored in the second quartile, however, were not significantly more likely to graduate over students who scored in the first quartile.

In order to look more closely at the variable high school GPA, dummy variables were created. The high school GPAs were also broken down into four quartiles. The breakdown of each quartile can be found in Table 6. The reference group used to compare high school GPA was the first quartile. When compared to students who scored in the first quartile on high school GPA, students who scored in the third quartile were 1.81 times more likely to graduate, and students who scored in the fourth quartile were 4.29 times more likely to graduate. Students who were in the second quartile were not significantly more likely to graduate than students in the first quartile.

In order to look more closely at the variable race, dummy variables were created. The reference group used to compare race was the White student group. Students who identified themselves as Black were 48% less likely to graduate when compared to White students. The odds for graduating were not found to be statistically significant for students categorized as others and unknown, when compared to the White student group. Table 20 presents the binary logistic regression results for predicting graduation.

Table 20

*Logistic Regression Analysis Predicting Graduation*

Predictor	B	SE	<i>p</i>	Relative Risk	95% CI
Dual Enrollment	0.52	0.33		0.68	[0.87, 3.21]
Gender	0.47	0.16	**	0.59	[1.15, 2.21]
ACT					
21.01-23	0.23	0.26		0.26	[0.75, 2.11]
23.01-26	0.48	0.25	*	0.61	[0.99, 2.62]
26.01-35	1.01	0.26	**	1.74	[1.64, 4.59]
HS GPA					
2.941-3.31	0.39	0.31		0.48	[0.81, 2.71]
3.311-3.70	1.04	0.28	**	1.82	[1.62, 4.89]
3.701-4.0	1.67	0.28	**	4.29	[3.06, 9.13]
Race					
Black	-0.65	0.24	**	-0.48	[0.32, 0.84]
Others	0.08	0.27		0.08	[0.64, 1.83]
Unknown	-0.06	0.42		-0.04	[0.42, 2.14]
Constant	-3.24	0.31	**	-0.96	

Note. Dummy variables were created for ACT, HS GPA, and race.

Cut value 0.50

\**p* < 0.05. \*\**p* < 0.01.

## **Chapter 5**

### **Discussion**

This chapter presents a summary of the study and important findings from the data presented in Chapter 4. Implications drawn from the data analysis will also be discussed, and recommendations provided for future research.

#### **Summary of the Study**

The time it takes for students to earn a postsecondary degree continues to increase, which has resulted in increased attrition rates and increased the cost of earning a degree. As previously stated in Chapter 1, the cost of attrition for one year and one cohort of students is estimated to be over \$4 billion (Schneider & Yin, 2011). One of the reasons for the increase in the time it takes to earn a degree is students are not entering higher education academically prepared. In order to better prepare students for academic success in college, and decrease the economic impact of students not graduating from college, policy makers have been expanding accelerated learning opportunities nationwide. The type of accelerated learning opportunity addressed in this study was dual enrollment.

In Tennessee, more colleges and universities are collaborating with area high schools to offer dual enrollment opportunities for high school students. This increase is in part attributed to the funding available for students to participate in the dual enrollment programs through the Dual Enrollment Grant, as well as the increased demands placed on higher education institutions by the Complete College Tennessee Act. As a result, more and more high school students are entering post-secondary education with college credits. However, little research has been conducted to determine if the program is in fact preparing students for academic success in higher education.

The purpose of this study was to examine students' academic performance, retention and degree attainment at the University of the Mid-South, after participation in the institution's high school based dual enrollment program. A group of dual enrollment students were compared to other students within their academic cohort who entered the academic institution with similar pre-entry educational characteristics. The pre-entry characteristics that were used to measure academic ability were: cumulative high school GPA and maximum composite ACT score. These parameters were chosen because they are the academic requirements for participation in the high school based dual enrollment program.

In order to determine if the current dual enrollment program is meeting the stated goals and objectives, the researcher conducted a quantitative statistical analysis using SPSS version 20. First, descriptive statistics were analyzed. The descriptive statistics were used to address all three research questions. Comparisons were made for students who were retained from one year to the next, students cumulative GPAs, and time to graduation. To address research question two, an independent sample *t*-test was conducted analyzing mean GPAs for dual enrollment participants and non-dual enrollment participants. To address research questions one and three, two-sample Chi-square tests were first conducted. The Chi-square tests allowed for analysis of variables that contain two or more categories where the observed frequencies were compared to the expected frequencies to determine significant differences (Hinkle et al., 2003).

Then, binary logistic regression analyses were conducted because the two-sample Chi-square tests omitted the effects of different independent variables on the dependent variable (Hinkle et al., 2003). Logistic regressions are used to "determine the impact of

multiple independent variables presented simultaneously to predict membership of one or other of the two dependent variable groups” (Burns & Burns, 2008, p. 569). The Omnibus Tests of model coefficients and the Hosmer and Lemeshow goodness-of-fit index were evaluated to determine fit of the regression equation, and the resulting odds ratios were interpreted to determine the impact of each independent variable on the dependent variables retention and graduation.

### **Findings**

Eighty-four percent of students who had participated in the dual enrollment program were retained for at least one year, and 79.3% of students who did not participate in the program were retained. This difference was found to be statistically significant after conducting the Chi-square analysis for retention by participation in the dual enrollment program. However, after evaluating the overall binary logistic regression model, participation in the institution’s high school based dual enrollment program did not significantly affect the probability that students would be retained for one year.

Other significant variables for predicting retention in this study included students who were female, students who had an ACT score of 26 and above, and students who had a high school GPA of 2.94 and above. Regarding race and retention, students who identified their race as Black were 24% more likely to be retained than White students. Students in the race category other, which included Alaskan Native, American Indian, Asian, Hispanic, Pacific Islander, and two or more races, were 59% more likely to be retained than White students.

The average first-year GPA for students who had participated in the institution’s high school based dual enrollment program was 3.01, whereas the GPA for students who

did not participate in the program was 2.76. After conducting an independent sample *t*-test, this difference was found to be significant, indicating that students who participated in the institution's high school based dual enrollment program had overall higher GPAs after their first year.

Twenty-five percent of students who had participated in the dual enrollment program graduated within four years, and 15.2% of students who did not participate graduated within the same time frame. This difference was found to be statistically significant after conducting the Chi-square analysis for graduation by participation in the dual enrollment program. However, after evaluating the overall binary logistic regression model, participation in the institution's high school based dual enrollment program did not significantly affect the probability that students would graduate.

Other significant variables for predicting graduation in this study were students who were female, students who had an ACT score above 23, and students who had a high school GPA of 3.31 and above. With regards to race, White students were 48% more likely than their Black peers to graduate within the four years of this study being conducted. However, there was no difference between the students in the other and unknown race categories when compared to the White student group.

### **Implications**

It is clear that participation in the high school based dual enrollment program has implications for success in higher education. As both Astin (1984) and Tinto (1975) explained through their theoretical models, students' active participation and integration into the higher education setting are important in decreasing attrition rates, as well as increasing student retention and completion of their selected degree programs. The

findings of this study came to the same conclusion. Specifically, students who had participated in the dual enrollment program had statistically higher GPAs, were more likely to be retained, and were more likely to graduate than students who did not participate in the dual enrollment program.

The findings in this study are similar to what other researchers found regarding dual enrollment program participation. In Florida and New York, Karp et al. (2008) found a positive relationship between dual enrollment participation and first semester GPA. This study also found a significant relationship between dual enrollment program participation and GPA after one year in higher education. In Oregon, North and Jacobs (2010) found that students who participated in dual credit courses persisted into the second year. In this study, 84.1% of students who had participated in the high school based dual enrollment program were retained, compared to 79.3% of students who did not participate in the program. The Southern Regional Education Board (2012) found that students who had participated in dual enrollment programs decreased the time to graduation. In this study, dual enrollment participants were 10% more likely to graduate in four years than those who had not participated in the program.

In Tennessee, participation in dual enrollment programs has increased since the implementation of the dual enrollment grant. In this study, the researcher found that enrollment in the University of the Mid-South's high school based dual enrollment program increased from 143 participants in 2006 to 530 participants in 2010. Approximately 24.8% of student participants matriculated to UMS after high school graduation. After analyzing the data and the literature regarding dual enrollment

programs, the researcher believes that there are implications for future institutional recruitment efforts with this particular student population.

These findings also have implications for Tennessee policy makers. As previously mentioned in chapter 2, the Lottery Stabilization Task Force was established in 2011, and the goal of the task force is to evaluate the lottery scholarship program in Tennessee (Lottery Stabilization Task Force, 2011). The findings in this study indicate that participation in the dual enrollment program is preparing students for academic success in higher education, and verifies that the goals and objectives of the dual enrollment program are being met. This information is beneficial to the task force as they continue to evaluate the lottery scholarship program to determine how it can be sustained in the future.

### **Future Research**

As previously stated in chapter three, only 370 (5.8%) students out of the 6,377 students included in this study had participated in the dual enrollment program. In order to have a better understanding of how participating in dual enrollment impacts retention and GPA, it would be beneficial to look at the statistics again in five years after more program participants matriculate to the institution. Another future research implication would be to evaluate retention and GPA annually from first year enrolled through graduation. This would allow for a look at the impact of participation in the dual enrollment program over time.

When analyzing graduation results, only 61 (4.4%) students out of the 1,396 included in the analysis from the 2008 academic cohort had participated in the institution's high school based dual enrollment program. These low numbers could have

potentially impacted the results of the binary logistic regression analysis. Reanalyzing the graduation results in five years would increase the number of academic cohorts to include in the study, thus analyzing more students who had participated in the dual enrollment program.

This study did not look specifically at the impact of participation in a dual enrollment program on different racial groups. It did, however, find that Black students who had a minimum high school GPA of 2.5 and a minimum ACT score of 19 were 24% more likely to be retained than their White peers. This finding is contradictory to current research and literature regarding retention and different racial groups. Further research should be conducted to determine what factors are contributing to this finding. This could potentially impact what programs and services are available for student success in the future.

Other future research implications include taking a closer look at the college environment and academic performance after participating in a dual enrollment program; analyzing potential differences by department or major after participating in a dual enrollment program; and duplicating this study at other higher education institutions that offer dual enrollment courses. Specifically, this study could be duplicated at other four-year institutions in Tennessee that offer dual enrollment programs. This would provide an in-depth analysis of dual enrollment program participants' academic performance, as well as provide evidence for future policies and procedures in higher education and across the state of Tennessee.

## **Conclusion**

According to Parker Palmer (1998), “if we want a movement for educational reform, we must learn to embrace this paradox. We must also learn the logic of a movement, learn how a movement unfolds, partly so that we can know where we are located within it, partly so that we can help it along” (p. 166). This is particularly true now as the climate in higher education is changing. In order to embrace the movement Palmer refers to, higher education officials have the opportunity to collaborate with high school officials and offer advanced learning opportunities through dual enrollment courses. By reaching out and partnering with high schools, higher education institutions are able to plant the seed of success in higher education before students even walk on campus.

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## Appendix A

States offering dual enrollment online as mandated by state policy:

1. Delaware
2. Idaho
3. Indiana
4. Iowa
5. Louisiana
6. Michigan
7. Mississippi
8. Nebraska
9. Nevada
10. New Mexico
11. North Dakota
12. Ohio
13. Oklahoma
14. Oregon
15. South Carolina
16. South Dakota
17. Tennessee
18. Texas
19. Washington

## Appendix B

### Tennessee HOPE Scholarship Eligible Postsecondary Institutions

Art Institute of Tennessee-Nashville	Roan State Community College
Austin Peay State University	South College
Baptist Memorial College of Health Sciences	Southern Adventist University
Belmont University	Southwest Tennessee Community College
Bethel University	Tennessee State University
Bryan College	Tennessee Temple University
Carson-Newman College	TN Tech Center at Athens
Chattanooga State Technical Community College	TN Tech Center at Chattanooga
Christian Brothers University	TN Tech Center at Covington
Cleveland State Community College	TN Tech Center at Crossville
Columbia State Community College	TN Tech Center at Crump
Cumberland University	TN Tech Center at Dickson
Dyersburg State Community College	TN Tech Center at Elizabethton
East Tennessee State University	TN Tech Center at Harriman
ETSU-School of Pharmacy	TN Tech Center at Hartsville
Fisk University	TN Tech Center at Hohenwald
Free Will Baptist Bible College	TN Tech Center at Jacksboro
Freed-Hardeman University	TN Tech Center at Jackson
Hiwassee College	TN Tech Center at Knoxville
Jackson State Community College	TN Tech Center at Livingston
John A. Guppton College	TN Tech Center at McKenzie
Johnson University	TN Tech Center at McMinnville
King College	TN Tech Center at Memphis
Knoxville College	TN Tech Center at Morristown
Lane College	TN Tech Center at Murfreesboro
Lee University	TN Tech Center at Nashville
LeMoyne-Owen College	TN Tech Center at Newbern
Lincoln Memorial University	TN Tech Center at Oneida/Huntsville
Lipscomb University	TN Tech Center at Paris
Martin Methodist College	TN Tech Center at Pulaski
Maryville College	TN Tech Center at Ripley
Memphis College of Art	TN Tech Center at Shelbyville
Middle Tennessee State University	TN Tech Center at Whiteville
Milligan College	Tennessee Technological University
Motlow State Community College	Tennessee Wesleyan College
Nashville State Community College	Trevecca Nazarene University
Northeast State Community College	Tusculum College
O'More College of Design	Union University
Rhodes College	University of Memphis

University of Tennessee, Chattanooga	
University of Tennessee, Knoxville	
University of Tennessee, Martin	
University of Tennessee Health Science Center	
University of the South	
Vanderbilt University	
Victory University	
Volunteer State Community College	
Walters State Community College	
Watkins College of Art and Design	